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WILDLIFE IN NORTH CAROLINA

NORTH CAROLINA Wildlife RESOURCES COMMISSION

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WILDLIFE IN NORTH CAROLINA 2010 PHOTO COMPETITION

Fowler, an aptly named Lab, takes cover on a bitterly cold duck-hunting day in Pamlico Sound. This candid, well-composed image was entered in the Outdoor Recreation category. **PHOTOGRAPH BY JUSTIN HARCUM.**

Volume 75 | Number 1

WILDLIFE IN NORTH CAROLINA

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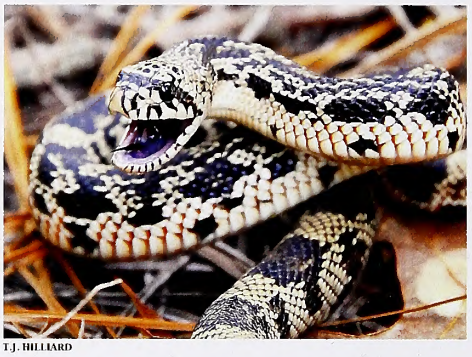
Cover: Great timing, a little luck and a lot of determination are qualities that this juvenile loggerhead sea turtle and the Grand Prize-winning photographer had in common. PHOTOGRAPH BY JACKIE ORSULAK.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

It has really been gratifying how people have expressed their fondness for our annual photo competition issue over the past six years. Honestly, when we started working on putting together the competition, we had no idea if people would like it or if they would complain that the issue contained no feature articles. Perhaps it's the fact that the magazine has always had a reputation for great photography, and this issue is chockfull of great photos. Whatever the reason, we plan to keep on doing it.



T.J. HILLIARD

It has also been a lot of fun meeting and getting to know the talented photographers who place in the competition. Their reasons for taking part in photography and the enjoyment they get from it are surprisingly different from person to person. Some have their little niche, while some enjoy photographing a wide range of subjects.

Either way, these photographers are doing exactly what the competition is intended to encourage—getting outside and enjoying the wild parts of North Carolina, and learning about the habitats and animals that compose them. This is a crucial function of the N.C. Wildlife Resources Commission, because without education and encouragement, there is no next generation of conservationists in our state.

T.J. Hilliard, who shot the photo on this page of the Northern pine snake in defensive posture, has submitted and won in the competition with snake images in the past. He had a great picture in 2008 of a Northern black racer eating a ringneck snake. Hilliard submits photos of other subjects, but his passion for snakes shows through.

If you have a passion for wildlife but have never tried photography, give it a shot. A digital point-and-shoot camera can be fairly inexpensive, and a camera club or online resources can provide some of the training you need. The Carolinas' Nature Photographers Association (www.cnpa.org) is an excellent place to start. The rest is up to you.

If you already love taking photos, please check out our website, www.ncwildlife.org, starting on May 1 to review the rule updates and get photo tips. The competition will open on June 1 and close Sept. 1. Get out there and start taking photos now!

Greg Jenkins

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ng a River

icle "The Wall on the Cape Fear" in the ber 2010 issue was of particular interest as my family has lived all up and down pe Fear River for three generations. them was my grandfather, Capt. Daniel Black. His Scottish descendents can be back to all the little towns along the Cape ver, including Haywood. I did not know er that town really existed until I read ice Earley's article. Capt. Black was the iring master of the *Charles M. Whitlock*, eamship pictured in the article on page e was the first and the last of the 20th-y steamers on the Cape Fear, and both ndfather and the *Charles M. Whitlock* gracefully in 1926.

ley's journey to Averasboro reminds me of ent visits to my grandfather's home place ice upon a time" Point Caswell Village. int Caswell Cemetery is the only reminder e that this was once a bustling Black ort town for the early riverboat builders, s, merchants, farmers and their families Cape Fear River region. Thank you for such an informative article about the ttempts of taming the waterways of this c river of North Carolina.

Barbara Black Curtis
Wilmington

nkins: Gene Brooks of Pittsboro called to let v that there is now a museum and visitor's center located at Averasboro. The nonprofit group Averasboro Battlefield Commission Inc. operates the museum and oversees the battlefield, facilities, grounds and landmarks. Located off N.C. 82 three miles east of Erwin, the free Battlefield Museum is open Tuesday through Saturday from 10 a.m.–4 p.m. and Sunday from 1–4 p.m. It is closed on Monday. In addition to the book referenced in the article, "The Cape Fear" by Malcolm Ross, Brooks told us that there was a Harnett County historian named Malcolm Fowler who wrote "The Battle of Averasboro" in 1965, the same year Ross' book was published. Fowler also wrote "They Passed this Way" (1955) and "Valley of the Scots" (published posthumously in 1980), about the Cape Fear River.

Noisemakers?

On his always enlightening last page in *WINC*, Jim Dean writes in the October issue that the original meaning of "pop goes the weasel" is "lost to history." Not so. Peter Schwed in "God Bless Pawnbrokers" (1975), notes that the expression goes back to a 19th-century (not 18th) Cockney verse that describes the tribulations of a married woman with a drunkard husband who comes home without money. The wife "pops" (pawns) her "weasel" (flat iron) in order to buy food for the family. Since most English wives of the time had two "weasels" — one heating on the stove while the other was being used — the long-suffering wife still got to iron her loutish husband's shirts! In any event, a "popped weasel" is not a shot member of the *Mustelidae* family.

George Reiger
Conservation Editor Emeritus
Field & Stream
Locustville, Va.

I really enjoyed "When Cute Eats Cute" in the October edition. Thanks for that. I just thought that I'd give you the origin of "Pop! Goes the Weasel."

I've been a living historian for many years. One of the things often found in a Revolutionary War re-enactment site, especially at a historical spot that has a log cabin or an old house on it, is a group of ladies who demonstrate wool carding, dyeing, spinning and weaving. One of the items used in this long process is called a yarn winder called a "weasel." It is a piece of equipment that sits next to the spinning wheel. It is an affair with "arms" on it and a device that allows the user to turn it around to wind up a length of yarn just off the spinning wheel. It has a toothed wooden cog and a "clacker" that gives a loud "pop" after so many turns. As I recall, weasels are designed to wind a yard of yarn with each complete turn so when the user hears the "pop," she cuts the yarn and takes it off the winder, gives it a twist, then sets it into a yarn basket.

I don't know who originated the little song that goes with it, but I have a feeling that it was a mother or grandmother who wanted to entertain children on cold winter days when they couldn't play outside, and as she wound up the yarn, she would sing the song.

Max Dolan
Sanford

Unspecktacular Stats

Love your magazine and have been a subscriber for over 10 years, ever since I moved to Emerald Isle from Northern Virginia. I have fished for speckled trout ("Super Specks," Nov. 2010) from Cape Lookout to Bogue Inlet and North to South River. I question the chart titled "N.C. Recreational Catch of Trophy Seatrout." One of my citations was on Nov. 8, 2004. Your chart shows that "zero" were caught over 24 inches? Mine was 25 inches and 4 ½ pounds. That was one of my best years fishing from Bogue Banks, and my log shows many, many limits of 10 fish over 15 inches. Our group usually does not keep fish under 15 inches. All were caught on Mirrolures.

Lee Throckmorton
Emerald Isle

rite us

etters should be sent via e-mail to **letters@ncwildlife.org** *or through regular mail to Letters, Wildlife in North Carolina magazine, 1712 Mail Service Center, Raleigh, NC 27699-1712. lease include your name, address and daytime phone number. Letters chosen for publication may be edited for clarity and length.*

WILDLIFE IN NORTH CAROLINA

2010 PHOTO COMPETITION

There's patience, and then there's patience. It took Jackie Orsulak 10 years to get the photo that won this year's photo competition. For the past decade, she has volunteered to guard sea turtle nests near her home in Duck. The idea is to have someone there when the hatchlings emerge to make sure they have a good chance at reaching their new home in the Atlantic. Orsulak was minding a nest at Southern Shores last summer when the hatchling in her Grand Prize photo made a break for it in the early evening while it was still light out. Usually, hatchlings do not emerge until darkness falls.

The photo is also unusual because both of the turtle's flippers are raised. Juvenile turtles usually drag themselves into the sea with an awkward "hand over hand" motion, which means that one flipper is up and the other down at any given time.

Some of our other winners were barely born when Orsulak started watching turtle nests. We had a surprising number of young photographers place in open categories this year, including 14-year-old Landon Carter (second place, Mammals), 15-year-old Nikolas Wall (second place, Invertebrates) and 11-year-old Nicole Howren (honorable mention, Outdoor Recreation, and first place, Youth 12 & Under).

In many ways, this aspect of the photo competition has surpassed our wildest hopes. When we started making plans in 2004 for the first competition, we wanted to encourage high-quality nature photography and to identify talented wildlife photographers working in North Carolina. We hoped that families would grab their cameras and head outside to learn about North Carolina's amazing wildlife and wild places through photography. We didn't expect that young photographers would compete for top prizes with the adults, but that notion disappeared last year when 16-year-old Kaylyn Gruber won the Grand Prize.

This year's field totaled 5,511 photographs. In the competition's sixth year, 1,270 photographers took part, including 149 junior shutterbugs in the two youth categories. The most popular subject was Birds (928 entries), followed closely by Invertebrates (881) and Wild Landscapes (786). Wild Plants received 657 entries and Animal Behavior 557, Outdoor Recreation 518, Reptiles & Amphibians 500, Mammals 425, Youth 13–17 143 and Youth 12 & Under 116.

We thank our corporate sponsor, Great Outdoor Provision Co., for its generous participation in this year's competition. Valuable support was provided by our co-sponsors, the N.C. Museum of Natural Sciences and the N.C. Division of Parks and Recreation. UNC-TV really stepped up this year by producing the original special program "North Carolina Lens," which highlighted past winning photos from the competition and explained what made them great.

Our judges included *Wildlife in North Carolina* art director Vickie Cumbee; *WINC* graphic designers Marsha Tillett and Kristie Rhodes; magazine photographer Melissa McGaw; Mike Dunn, senior manager of outreach for the museum; and Charlie Peek, public information officer for Parks and Recreation and a former photojournalist.

All winning photographs may be seen on exhibit through March at the museum thanks to our exhibition sponsor, JW Photo of Raleigh. Various North Carolina state parks will exhibit selected photos from the competition throughout the year. Details and rules for the 2011 competition will be posted on www.ncwildlife.org in May. The entry period will open on June 1 and close on Sept. 1.

—Greg Jenkins

GRAND PRIZE WILDLIFE IN NORTH CAROLINA 2010 PHOTO COMPETITION

Jackie Orsulak, Duck
Baby loggerhead sea turtles, Southern Shores

Orsulak is a member of the Network for Endangered Sea Turtles, a volunteer organization dedicated to the protection of turtles off the Outer Banks. She was on nest-watching duty last July 30 when this hatchling emerged at 7:15 p.m. "He was striving to reach the sea after shaking off the first wave that washed over him," Orsulak said. "With the next wave he began his long and incredible journey." The judges found this image compelling because it captures a dramatic moment of an animal's struggle to survive.

Technical specs: Canon EOS digital Rebel XT, 100–400 mm lens, ISO 400, 1/400, *f*/7.1

BIRDS **FIRST PLACE**

Gene Furr, Raleigh
Great egrets fighting, Wilmington

Furr frequently photographs colonial waterbird rookeries on the coast. Great egrets fight for mating dominance both aloft and on the roost. Furr captured all the action of one of these mating fights and still managed to properly expose the white birds against the white sky.

Technical specs: Nikon D300, Nikon 200–400 mm lens, 1/2500, *f*/4

S SECOND PLACE

)ecker, Newport
er yellowlegs, Rachel Carson Estuarine Reserve

er shot this photo from a kayak gently grounded on a shoal
yards from two birds fishing in the same pool. He said he
rs to photograph birds at the reserve at high tide, because
irds bunch up on the few remaining shoals. This photo was
i just before low tide, giving him an opportunity he would
ave had if the tide was high.

ical specs: Canon 40D, Sigma 50–500 mm lens @ 500mm, ISO 400,
), f/8.0

BIRDS THIRD PLACE

Ed Erkes, Seven Springs
Common yellowthroat, Seven Springs

Erkes lives on 25 acres, including a 1-acre pond, landscaped to attract wildlife. The yellowthroat had established its territory in some shrub/brush habitat at one end of the pond. Another yellowthroat established territory at the opposite end of the pond, and they would often sing to one another.

Technical specs: Nikon D300, Sigma 300–800 mm lens with 1.4X tele-converter, ISO 400, 1/640, f/7.1

BIRDS **HONORABLE MENTION**

Ellen Devenny, Kings Mountain
Great horned owl,
Carolina Raptor Center, Huntersville

Mattie the owl has been a resident of t
raptor center since 2000 after becomi
entangled in barbed wire and damaging
wing irreparably. Devenny was touring t
facility in January 2010 and was able to
ture this lovely portrait.

Technical specs: Canon Powershot SX20 IS, 58
focal length, ISO 200, 1/100, *f*/5.6

BIRDS **HONORABLE MENTION**

Jay Wickens, Powells Point
Snow geese, Pea Island National Wildlife Re

Wickens, a frequent photographer of coa
scenes, took this iconic image of these
winter waterfowl flying through snow i
February 2010.

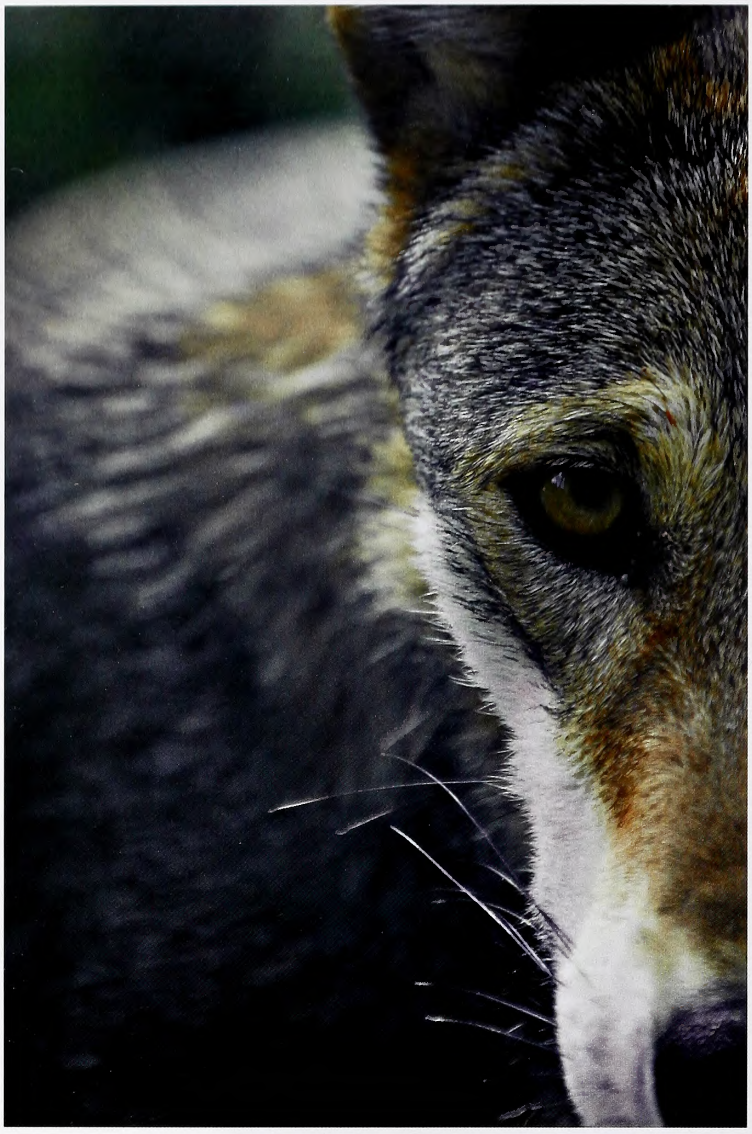
Technical specs: Canon 50D, 100–400 mm lens,
ISO 640, 1/3200, *f*/5.6

MAMMALS **FIRST PLACE**

Mark Stanley, Wilmington
Black bear, N.C. Zoo, Asheboro

Stanley and his family were visiting the zoo when they noticed a crowd gathered at the black bear enclosure. "We must have missed something because the crowd started thinning out," Stanley said. "I was thinking, 'I wish the bear would stop and pose for me.'" The bear did exactly that, walking over, sitting down and looking directly up at Stanley, who leaned over the retaining wall to get this portrait.

Technical specs: Canon 40D, 70–200 mm *f*/4 IS lens, ISO 400, 1/250, *f*/6.5; Spot metering used to properly expose the bear's snout



MAMMALS **SECOND PLACE**

Landon Carter, Cary
Red wolf, Western North Carolina Nature Center, Asheville

Even a captive animal can seem wild with the right framin
Landon, who is 14, was visiting the nature center with hi
grandparents. He was having a tough day photographical
because the light was low and he often had to shoot throu
glass or fences. However, this red wolf stood still long enou
for him to compose a nice image.

Technical specs: Nikon D60, 55–200 mm lens, ISO 400, 1/320, *f*/5.

MAMMALS **HONORABLE MENTION**

Chuck Carmack, Wilmington
Red fox, Airlie Gardens, Wilmington

A female fox watches cautiously from
the brush as her kits run about. Carma
noticed the animal and the unique light
and captured this image.

Technical specs: Canon 40D, 100–400 mm le
ISO 500, 1/400, *f*/7.1

MAMMALS **HONORABLE MENTION**

Gene Furr, Raleigh
Fox squirrel, Brunswick County

Using a shallow depth of field and an interesting perspective, Furr was able to separate the background from the subject and capture this handsome portrait last March. Fox squirrels are found in North Carolina's northern mountains and in the eastern part of the state in sandy pinewoods.

Technical specs: Nikon D300, 200 – 400 mm lens, 1/125, *f*/5.6

MAMMALS **THIRD PLACE**

James T. Allen, Zebulon
Juvenile squirrel, Nags Head

While visiting Nags Head, Allen was photographing squirrels when he noticed this young juvenile poking its head out of this opening. Contrasting shadows and light enhance the textures in this up-close and personal image.

Technical specs: Fujifilm HS10, ISO 400, 1/450, *f*/5.6

REPTILES & AMPHIBIANS **FIRST PLACE**

Linda Grant, Burlington
American toad, Burlington

Last summer there were toads all over Grant's neighborhood. She was trying to complete an assignment for a photography course, and following the toad around didn't work because the animal hopped away too quickly. Grant's daughter placed the toad on the trunk of a car, where it sat still just long enough for Grant to capture this double image. The toad was returned unharmed to the grass.

Technical specs: Canon 50D, Canon EF 50 mm 2.5 macro lens, ISO 100, 1/100, *f*/3.5

TILES & AMPHIBIANS
ND PLACE

otte Wilcox Ware, Belmont
salamander, Davidson River near Brevard

ested in teaching her children the fun lamander hunting, Ware visited the ah Center for Wildlife Education last ast. Center educators pointed her in the direction and provided field guides, Ware found this seldom seen salaman- n its crevice habitat. The judges liked ffset, well-lit subject and the focus on nimal's face.

ical specs: Canon EOS Digital Rebel XSi, 105 ocal length, 1/5, f/2.8

TILES & AMPHIBIANS
RD PLACE

Smalldridge, New Bern
n green snake, Indian Beach

ldridge was resting on a hammock at a c beach access when he heard a com- on among some birds. As he approached cene, he saw a blue jay and another ly away, leaving the beaten and stunned e. He grabbed his camera and photo- ned the snake as it recovered.

ical specs: Nikon D90, 105 mm macro lens, , f/4

REPTILES & AMPHIBIANS
HONORABLE MENTION

Cal Wong, Chapel Hill
Spotted salamander inside egg, Hillsborough

Wong photographed this larval salamande while teaching photography techniques t an environmental educator last April. Th educator had collected the eggs from an ephemeral pond that was in danger of dryi up, and was propagating them in a pool at her home. Wong's experience in macr photography resulted in this interesting a uncommon image.

Technical specs: Canon 40D, Canon 100/2.8 m macro lens, ISO 250; 1/200, *f*/16; Canon 550EX flash on off-camera cable with LumiQuest soft box; flash bias 0.0.

REPTILES & AMPHIBIANS
HONORABLE MENTION

Travis Arnold, Cary
Fence lizard, Old Fort

Arnold and his wife were hiking at Old Fo along these railroad tracks when he spie the lizard. Carefully getting into a low po tion at track level, he composed a uniqu image of a fence lizard in one of the few pla its camouflage can't conceal it.

Technical specs: Olympus Camedia C-750

INVERTEBRATES **FIRST PLACE**

Mark Stanley, Wilmington
Leaf-footed bug nymphs, Wilmington

Stanley's daughters noticed the nymphs on some vines in their back yard, and ran inside to tell their dad to get his camera. The bug is so named because the adult has leaf-shaped formations on its rear legs. The crop and dynamic angles create an interesting and unique composition.

Technical specs: Canon 40D, 70–200 mm *f*/4 IS with extension tubes, ISO100, 1/25, *f*/8, handheld fill flash with diffuser, underexposed a half-stop.

INVERTEBRATES **SECOND PLACE**

Nikolas Wall, Hillsborough
Ant, Hillsborough

Nikolas, who just turned 15, is home-schooled and has many opportunities to be outside exploring and taking photos. On a cool afternoon, he was walking beside a creek near his house and saw this ant on an exposed root in a patch of filtered sunlight. By bringing the viewer down to the ant's perspective, this photo seemingly brings us into another world.

Technical specs: Sony Cybershot point-and-shoot

INVERTEBRATES **HONORABLE MENTION**

Ed Erkes, Seven Springs
Carolina mantid, Seven Springs

Erkes noticed the praying mantis on some goldenrod near his backyard pond. He took advantage of the mantis' inverted pose and the goldenrod's arc to create a unique composition.

Technical specs: Nikon D300, Nikon 200–400 mm zoom lens, ISO 800, 1/125, *f*/9.0

RTEBRATES **THIRD PLACE**

irkemeier, Southern Shores
crab, Southern Shores

meier was on the beach with nice evening light, learning how to use the tilting screen on his camera to take ground-shots with a super wide-angle lens. "I found a willing subject in this particular ghost crab, but it was moving fast unning among the footprints and staying in the shadows," Birkemeier said. "Focusing was a challenge, and I took of out-of-focus images. When it finally tired of my antics, it ran out into the sun and I snapped this lucky image."

ical specs: Nikon D5000, Sigma 10–20 *f*/4–5.6 lens at 19 mm, ISO 400, 1/500, *f*/7.1

NVERTEBRATES **HONORABLE MENTION**

Alan Sykes, Raleigh
Crane fly, Raleigh

Sykes' super-close image of this insect taken with a macro lens shows that a good photo can be taken anywhere—even in your own back yard.

Technical specs: Canon XSi

INVERTEBRATES **HONORABLE MENTION**

Bill Birkemeier, Southern Shores
Marginal sea stars, Ocracoke Island

On a May 2007 trip to Ocracoke, Birkemeier took advantage of willing photo subjects and a beautiful day, capturing a great picture of a beach that seems to go on forever.

Technical specs: Nikon D5000, Sigma 10–20 *f*/4–5.6 lens

WILD PLANTS **FIRST PLACE**

Kevin Council, Chapel Hill
Mushrooms, Chapel Hill

Council shot this nice arrangement of late-season mushrooms in November 2009. Because they were growing under a log, he had to prop his camera on the ground directly under the mushrooms. The light illuminating the mushrooms' edges and gills provides a fresh perspective to a common subject matter.

Technical specs: Canon 50D, Sigma 17–70 mm lens, ISO 800, 1/160, *f*/4.0

D PLANTS
ONDPLACE

d Blevins, Fuquay-Varina
rue-anemone, Eno River

ins photographed this rare and tiny
er in Durham County using a macro
and 68 mm of extra extension tubes
ve enough magnification to fill the
ıe with a single flower. A shallow
h of field helped simplify the back-
ınd and further focus attention on
oint of convergence.

ical specs: Nikon D3, 105 mm ƒ/2.8D macro
ISO 200, 1/100, ƒ/5.6, off-camera fill flash
gh a diffusion screen

D PLANTS
RD PLACE

Tisdale Harding, Kinston
umn olive, Lenoir County

ding discovered this plant while on
daily walk and returned later in the
when the light was more favorable.
squirmed his way into the dense,
kly bush to compose the olives back-
y the sun. When he returned the next
birds had stripped the invasive plant
of berries.

nical specs: Nikon D40X, 200 mm focal
th, ISO 200, 1/800, ƒ/5.6

WILD PLANTS
HONORABLE MENTION

Mike Baker, York, S.C.
Wild blueberries, Grandfather Mountain

Baker ascended the mountain in August
to photograph the sunrise, but fog bloc
it out. Instead, he switched gears and b
shooting close-ups. The blueberries in
ious stages of ripening, covered with fi
dew, made for a striking but quiet imag

Technical specs: Nikon D3, Nikon 200 Micro *f*
lens, ISO 1600, 1/180, *f*/8

WILD PLANTS
HONORABLE MENTION

Allyson Brown, Manteo
Gaillardia, Salvo

Brown liked the bright bursts of red, ora
and yellow flowers blanketing the dun
along Cape Hatteras. Her composition
for a nice image of a common but love
coastal bloom.

Technical specs: Nikon D70, 1/640, *f*/5.6

OUTDOOR RECREATION **FIRST PLACE**

Joel Arrington, Oriental
Waterfowl hunting, Pamlico Sound

Arrington stood knee-deep in waders looking for interesting composition in a scene with an abundance of empty sky and water and without overhead flights of waterfowl. The goose decoy closest to the viewer became the anchor for an imaginary line leading the viewer to the hunters in the skiff and the blind beyond.

Technical specs: Canon 40D

OUTDOOR RECREATION
SECOND PLACE

Eric D. Peterson, Cary
Kite flying, Jockey's Ridge State Park

Peterson took this photo on his nephew's first trip to Jockey's Ridge in June 2008. As Peterson was walking up the dune, he noticed that his nephew was isolated from the other people and thought it would lend itself to a good composition. "Anyone who has been there on a beautiful summer day knows finding a spot without any other people is not an easy task," Peterson said.

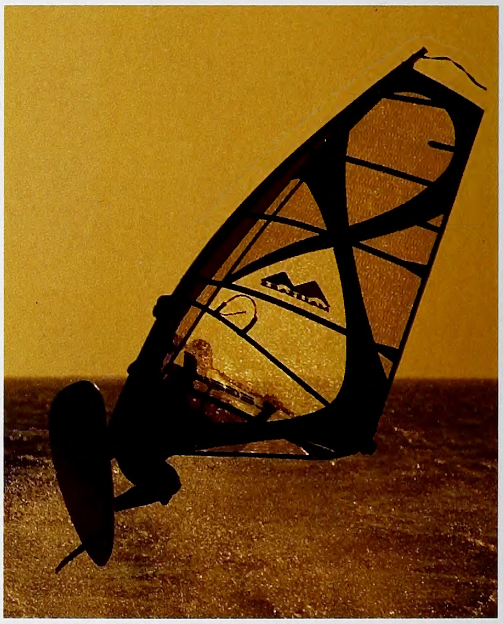
Technical specs: Canon 710 point-and-shoot, 1/320, *f*/8

OUTDOOR RECREATION
THIRD PLACE

Christopher Chao, Raleigh
Snowy hike, Round Bald on Roan Mountain

Several inches of fresh snow and some early afternoon sunshine convey the frigid temperature. The sign is the marker for Round Bald, and the two hikers in the background are Chao's wife and a friend. Departing clouds are visible in the horizon.

Technical specs: Sony W-300 point-and-shoot



OUTDOOR RECREATION
HONORABLE MENTION

Christiana Nicole Howren, Cary
Windsurfing, Buxton

Nicole, who is only 11 years old, captured this dynamic image one May evening on the Outer Banks. She and her family were watching the sunset and saw windsurfers doing tricks in the high wind. "The sand was blasting and burning from the wind, but we could not stop watching," Nicole said.

Technical specs: Nikon D40, 55–200 mm *f*/4.0–5.6 lens, ISO 200, 1/1250, *f*/5.6

WILD LANDSCAPES **FIRST PLACE**

Paul Malcolm, Garner
Beach landscape, Fort Macon State Park

Malcolm, a viola player in the N.C. Symphony, takes photographs at the many locations he visits on his travels with the symphony. He tried several different compositions this October 2009 evening at Fort Macon, pointing the camera in different directions relative to the sun. This was one of the last pictures he took before the sun set behind the dunes. "I didn't get a good sunset picture that day," Malcolm said, "but sometimes pointing the camera away from the sunset can get the best shot."

Technical specs: Canon 5D Mark II, 17–40 *f*/4L lens at 17mm, ISO 800, 1/180, *f*/8

WILD LANDSCAPES **SECOND PLACE**

George Bissinger, Greenville
Lake Mattamuskeet, Mattamuskeet National Wildlife Refuge

Bissinger visits Lake Mattamuskeet frequently and has photographed this scene a few times. This shot was taken in May 2010 on one of those perfect coastal days with a mirror water surface and low, puffy clouds. He cropped the image a bit to create a more panorama-like photo.

Technical specs: Nikon D300

WILD LANDSCAPES
HONORABLE MENTION

Jason Marshall, Harrisburg
Little Hump Mountain, Appalachian Trail

Marshall captured this image on a back-packing trip along the Appalachian Trail. "The clouds and fog were breaking up in the morning and it was quite a sight," he said. The judges liked how the trail leads the eye off the edge of one hill and back to the trail in the distance.

Technical specs: Canon Rebel XSI

WILD LANDSCAPES
HONORABLE MENTION

Gary Carter, McLeansville
Waves, Outer Banks

Carter is a veteran outdoor photographer who often leads photo outings and seminars. The abstract simplicity of this stormy scene made for a dramatic, beautiful image of these crashing waves.

Technical specs: Nikon D700 D3S

WILD LANDSCAPES **THIRD PLACE**

Kevin Council, Chapel Hill
Icicles, Jordan Lake

Council, a native of central North Carolina, loves winter images because of the scarcity of truly cold weather near his home. The interesting shape of these icicles was created as they melted and refroze, creating interesting shapes.

Technical specs: Fuji Finepix IS1, ISO 80, 1/340, *f*/4.5

ANIMAL BEHAVIOR **FIRST PLACE**

Mike Baker, York, S.C.
River otter shaking off water, Grandfather Mountain

Baker saved the animal exhibit for last on his June 2010 visit to Grandfather Mountain. "Only one otter was active, and it would dive, swim, shake, repeat," Baker said. He set his shutter and aperture to stop action, and the otter cooperated before retiring for a nap.

Technical specs: Nikon D3, Nikon 300 *f*/2.8 lens, ISO 400, 1/2000, *f*/5.6

AL BEHAVIOR
ND PLACE

pher Chao, Raleigh
nged blackbirds, Pocosin Lakes
al Wildlife Refuge

as Chao's favorite photo of a day at the
because of the flight formation. "The
ook off in a circular pattern, which
like a giant tornado," he said. He knew
oto was special when his father-in-law,
d ornithologist, was impressed.

al specs: Canon EOS Rebel T1i, 100–400
4.5–5.6 lens, ISO 400, 1/640, *f*/10.0

AL BEHAVIOR
D PLACE

Taylor, Goldsboro
l fighting sparrow, Goldsboro

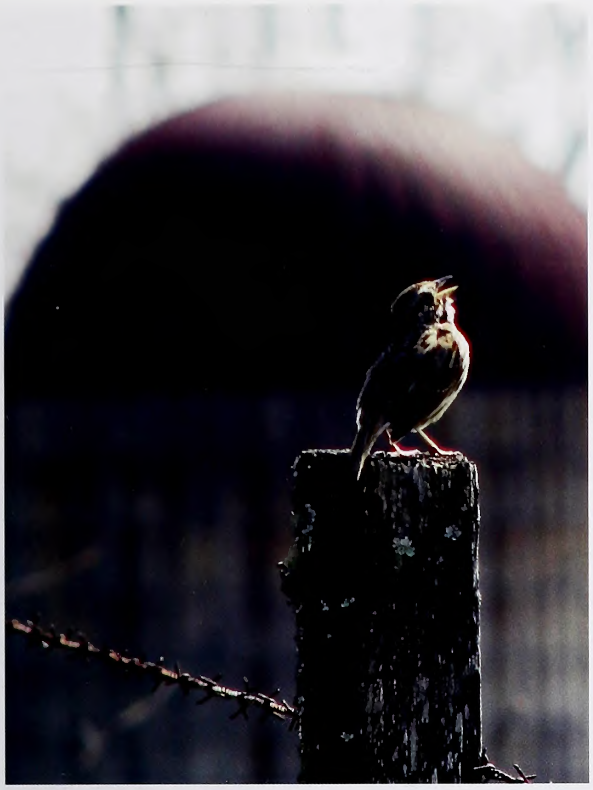
was set up on the back porch of his
focusing on a sparrow feeding on
ed he had placed in a log. While he
iting for the sparrow to look back
the camera, he saw a blur, pressed
utter, and saw the cardinal flying off.
timing on the part of the two birds,"
. "If I had been trying for this exact
nt, I probably would not have gotten
ot due to shutter lag."

al specs: Nikon D300, ISO 200, 1/1600,

YOUTH PHOTOGRAPHER 13–17
FIRST PLACE

Caroline Lore, Smithfield
Crab in angler's hand, Surf City

Caroline's dad owns Surf City Pier, and this photo is of one of the pier regulars showing his bait before placing it on the hook. Caroline, 17, created a great composition and further enhanced the picture by converting it to black-and-white.



YOUTH PHOTOGRAPHER 13–17
SECOND PLACE

Jacob Forrest Creasman, Mills River
Chipping sparrow, Mills River

Jacob, 16, was trying out his mom's new camera on this shot. He was searching his back yard and the cornfield that adjoins it when he noticed the sparrow singing on the fencepost. A little morning light and interesting composition made for a nice image.

YOUTH PHOTOGRAPHER 13–17
THIRD PLACE

Alex Prevatte, Greensboro
Beach landscape, Jockey's Ridge State Park

Composition is everything in this image by Alex, 16. A big sun, a small person and sand that seems to go on forever make Jockey's Ridge look like the Sahara Desert.

H PHOTOGRAPHER 13–17
ORABLE MENTION

n Auger, Southport
and water, Boiling Springs Lakes

n, 14, captured beautiful clouds, light flections in this lakeside landscape.

YOUTH PHOTOGRAPHER 13–17
HONORABLE MENTION

Kimberly Moran, Matthews
Dragonfly, Matthews

A car antenna provided a good photo opportunity for Kimberly, 15.

YOUTH PHOTOGRAPHER 13–17
HONORABLE MENTION

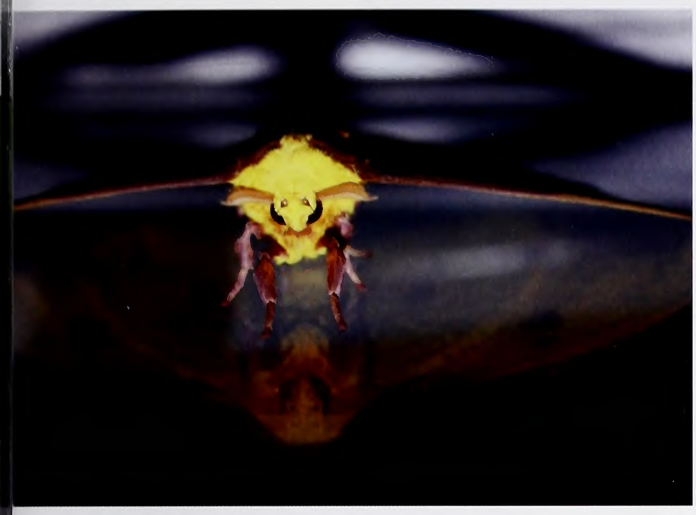
Kayla Ellison, Boone
Linn Cove viaduct, Blue Ridge Parkway

Kayla, 16, took this iconic image during a parkway visit during peak leaf time in October 2009.

YOUTH PHOTOGRAPHER 12 & UNDER
FIRST PLACE

Christiana Nicole Howren, Cary
Skipper, Apex

Nicole, 11, returned to her school, St. Mary Magdalene, on a Sunday last August to photograph butterflies on butterfly bushes. Her skilled macro work was not without a cost, however. "While shooting, we got bitten by an army of ants and had to pour cold water over our feet," she said.



H PHOTOGRAPHER 12 & UNDER
ND PLACE

Lucero, Hillsborough
eflected, Hillsborough

, 12, was outside with her dog when she saw this large
land on the glass front door of her home. She bolted
ne house, grabbed her mother's camera and got a low
to capture this neat image.

YOUTH PHOTOGRAPHER 12 & UNDER
THIRD PLACE

Scout Hayashi, Chapel Hill
Angler, Watagua River

Scout, 10, and her dad were wading the river looking for a good fishing spot when she took this photo in April 2010. The conversion to black-and-white gives it an even more serene feel. Scout caught 10 fish that day, which was also her 10th birthday.

H PHOTOGRAPHER 12 & UNDER
ORABLE MENTION

Kate Halstead, Walkertown
ider on zinnia, Walkertown

ent winner Emma, 9, captured this
ng combination of white, pink and
in her own back yard.

YOUTH PHOTOGRAPHER 12 & UNDER
HONORABLE MENTION

Nathan Lemonds, Troy
Skink with eggs, Troy

Flipping logs while looking for snakes revealed this skink nest and Nathan, 11, did the rest.

YOUTH PHOTOGRAPHER 12 & UNDER
HONORABLE MENTION

Zachariah B. Arnold, Carolina Beach
Beach landscape, Carolina Beach

Zach, 12, visited the tidal pools on the north end of the beach last New Year's Eve to take this photo.

Since ancient times, people have been watching clouds and using them to predict weather.

Look to the Sky!

written and illustrated by Consie Powell / nature activity by Anne M. Runyon

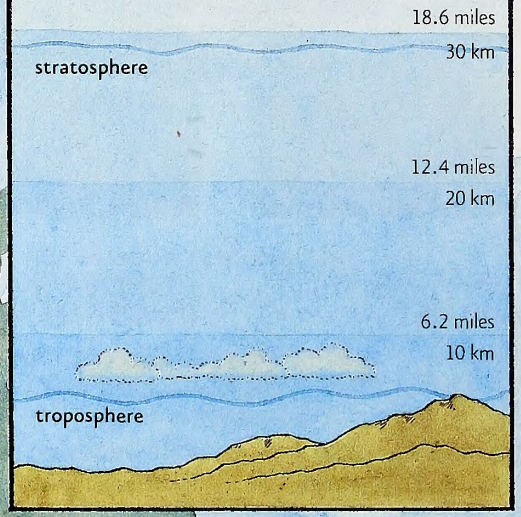
Sometimes breathtakingly beautiful, sometimes just gray and socked in, clouds are essentially a weather station in the sky. They can tell us what is happening at different levels of the atmosphere, and can give us a bit of foreknowledge of what kinds of weather happenings may occur in the near future.

SCENE OF THE ATMOSPHERIC ACTION

To understand clouds and what they can tell us, we need a bit of weather background. In order to have weather, a planet needs to have an atmosphere. Earth's atmosphere is a thin protective envelope of gases, including oxygen and nitrogen, foreign particles such as dust, and water vapor. Earth's atmosphere is about 50 miles thick, and most of the actual weather happenings take place within about 18 miles of the earth's surface.

STRUCTURE OF EARTH'S LOWER ATMOSPHERE

Vertical mixing of hot and cold air currents takes place, often quite energetically, in the lowest portion, the troposphere. Because air temperature and movement inevitably stabilize before reaching the stratosphere, most weather is confined to this lower part of the atmosphere.



WATER MAKES WEATHER

Without water, there would be no weather. And because Earth has water, we have weather, in all its various forms. Water in the atmosphere ranges from very little, in dry desert and polar regions, to as much as 4 percent, by volume, in jungle areas. Water can exist in gaseous (invisible vapor), liquid (rain, fog) or solid forms (snow, sleet). As air moves through levels of the atmosphere, affected by factors such as temperature and air pressure, the water in the atmosphere does different things. One of those things is the formation of clouds.

Earth's atmosphere is thin, compared to the diameter of the planet, but it is thick enough to protect Earth from hazardous rays and dangerous objects from space, such as asteroids and other celestial debris.

HAT ARE CLOUDS?

ouds form when moist air is cooled to the point at invisible water vapor condenses into tiny sible water droplets. When it reaches this tem- rature, it has reached its dew point. We see ese droplets as a cloud.

Sometimes the cooling of moist air is caused convection, where rising air currents are used by uneven heating of the earth's surface. moist air rises, it expands and cools, and esto — a cloud. In other cases, moist air might lifted by a geographic feature, such as a moun- in. This is called orographic lifting. In both ses, clouds form.

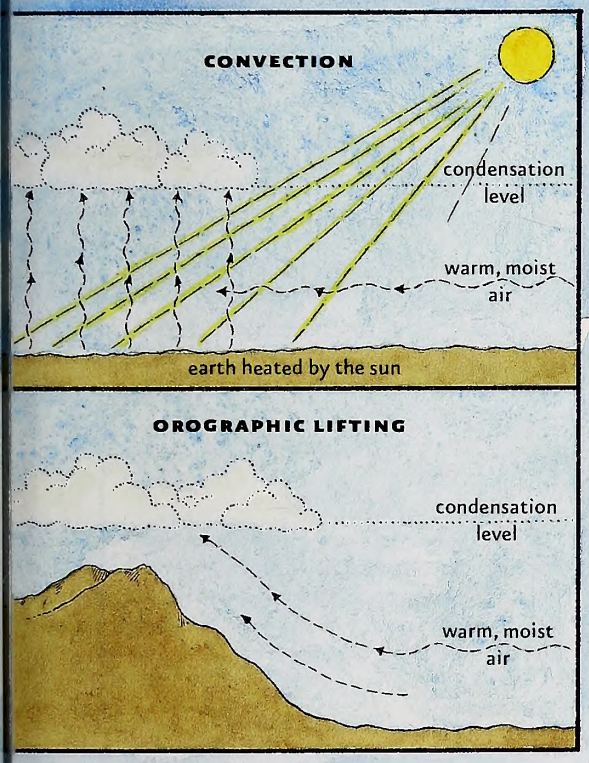


TABLE OR UNSTABLE

rth heats up and cools down, day after day. any different factors affect this heating and cooling cle, and whether the air is stable or unstable con- butes to what kinds of clouds form.

Air is unstable when it is heated from below by ssing over land or water that has been warmed by e sun. As the heated air rises, heaped clouds with t bases and rounded domes form.

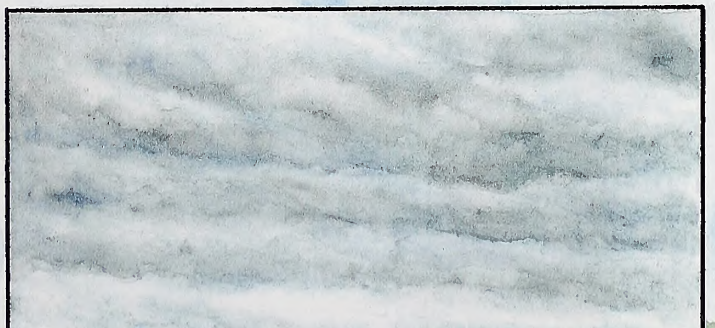
Stable air results from a layer of warm air over a er of cold air. Where these layers meet, a solid er of cloud forms and this essentially prevents nvection from taking place.

TYPES OF CLOUDS

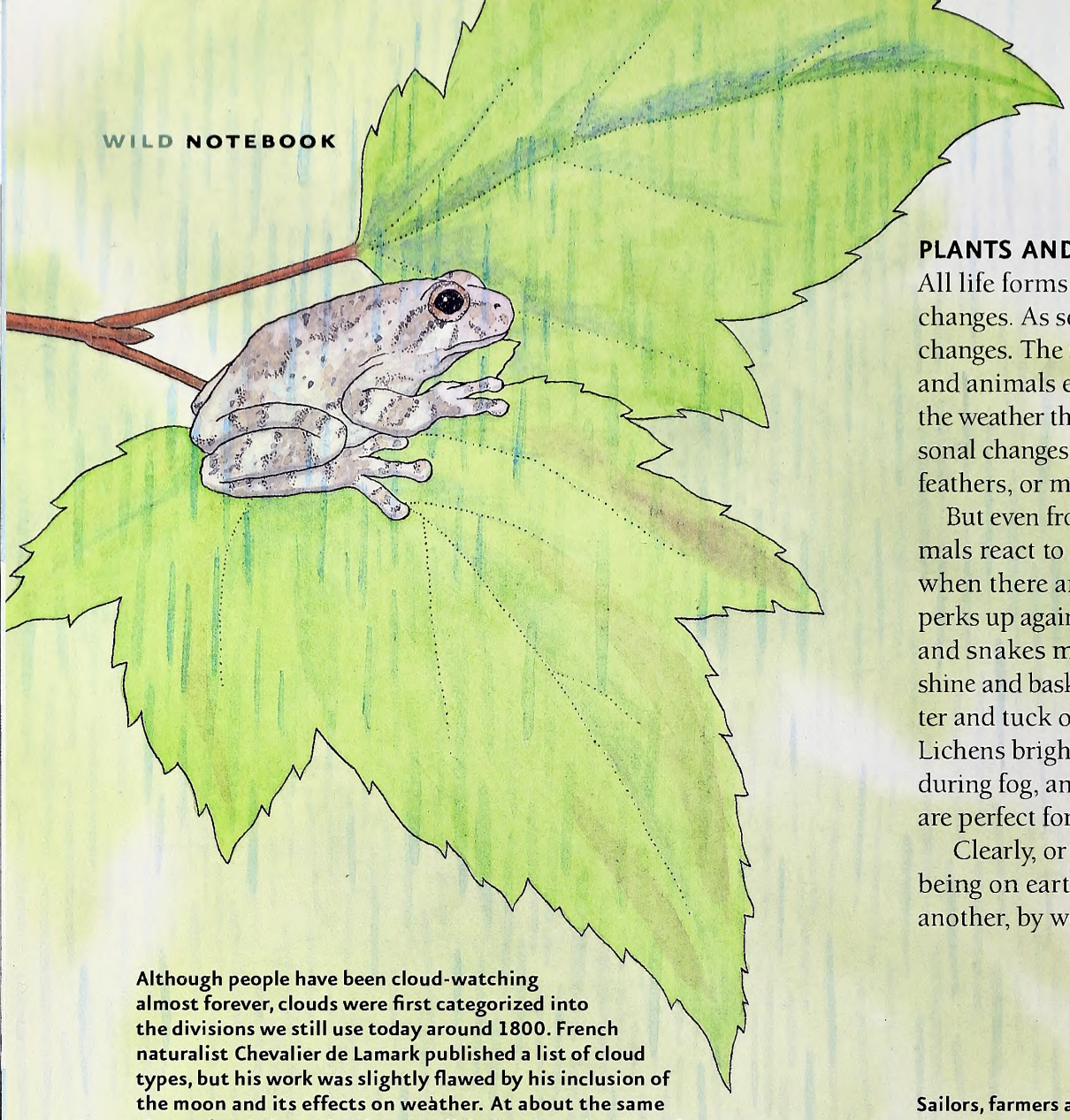
When you look up in the sky and see clouds, they are usually one of three basic cloud types. Meteorologists (scientists who study the atmosphere and weather) categorize clouds into further divisions, often according to their altitude. They are fascinating in their variety, but are all still basically related to the basic types: cirrus, cumulus and stratus.

Cirrus clouds are thin, wispy clouds that are very high in the sky. Because they are so high, where the air is very cold, they are made of ice crystals. Their feathery appearance is the result of wind stretching strands of falling particles of ice.

Cumulus clouds are round and puffy, formed by unstable air. They may be mostly white on a fair day, or depending on the degree of continued upward convection, they might grow into larger, towering gray clouds that can produce rain.



Stratus clouds are low sheets of solid gray, formed by stable air. They can cover an area like a blanket for days, and can settle in and bring days of rain or other precipitation. Fog is stratus clouds at ground level.



Although people have been cloud-watching almost forever, clouds were first categorized into the divisions we still use today around 1800. French naturalist Chevalier de Lamark published a list of cloud types, but his work was slightly flawed by his inclusion of the moon and its effects on weather. At about the same time — but independently — English chemist Luke Howard came up with the basic cloud classifications of cirrus, cumulus and stratus, and included in his assumptions that clouds could change from one form to another.

PLANTS AND ANIMALS

All life forms react to weather and its changes. As seasons change, the weath changes. The seasonal changes that pl and animals experience prepare them the weather they will encounter. Those sonal changes can include changes in fu feathers, or might trigger hibernation.

But even from day to day, plants and mals react to weather. Vegetation dro when there are long, hot stretches, th perks up again in a soaking rain. Lizar and snakes may take advantage of su shine and bask in its warmth, but seek s ter and tuck out of sight when rain co Lichens brighten, and are at their love during fog, and frogs know that rainy are perfect for staying comfortable.

Clearly, or cloudily, every single liv being on earth is affected, one way o another, by weather.

Sailors, farmers and others who work outside created sayings, or proverbs, that help them p the weather. These are usually based on obse tions, rather than scientific study. But they hold a fair bit of truth.

Get Outside

Watch clouds! Sometimes you'll get a clear sunny day with nary a cloud in the sky, but when that happens, just wait a bit — the weather is sure to change. When you see certain clouds in the sky, try to figure out what basic kind they are. Once you've figured that out, then take some time to go through a field guide to clouds, and narrow the categories a little further. There's so much to learn about clouds that getting a guide to clouds and keeping it handy for reference is probably the best way to learn clouds, bit by little bit.

Keep a cloud journal. Record what kinds of clouds you see, as well as the date, time and temperature outside. If you keep track like this over a number of days, you will be able to see what happens, day by day. Were cirrus clouds followed by some rain? Did cumulus clouds just form lovely shapes and float by, or did they build up into storm clouds?

What are different plants and animals doing during different kinds of weather?

Read and Find Out

- "Clouds" by Marion Dane Bauer, Simon & Schuster, 2004
- "Clouds (Let's Read and Find Out Science Series)" by Ani Rockwell, HarperCollins, 2008.
- "National Audubon Society Field Guide to North America Weather" by David M. Ludlum, Alfred A. Knopf, 1991.
- "Peterson First Guide to Clouds and Weather" by John A and Vincent J. Schaefer, Houghton Mifflin, 1991.
- "The Book of Clouds" by John A. Day, Sterling, 2002.
- "The Man Who Named the Clouds" by Julie Hanna & Joa Holub, Albert Whitman & Company, 2006.
- "Weather Words and What They Mean" by Gail Gibbons, Holiday House, 1992.

Find out more about Project WILD Workshops and literatur the Wildlife Commission's website at www.ncwildlife.org.

Make a Rainy Day Bookmark

Cut out your bookmark along the black lines. Fold in half along the ···· line and glue shut.

Bright ring around the sun or moon,
means snow or rainy weather soon.

CIRROSTRATUS CLOUDS

When high cloud layers made of ice crystals blanket the sky, the moon (or sun) looks hazy as a halo.

These cirrostratus clouds indicate that rain (or snow) is likely to come soon.

Mackerel sky, mackerel sky,
not long wet, not long dry.

ALTOCUMULUS CLOUDS

Sometimes the sky resembles the markings on a chub mackerel!

When such dense patches of altocumulus clouds fill the sky, scattered rain showers are likely to arrive later.

© Anne Marshall Runyan

Flying Squirrels Successfully Using Crossing Structure

N.C. Wildlife Resources Commission videos show endangered Carolina Northern flying squirrels using specially erected crossing structures to glide to the other side of the Cherohala Skyway in western North Carolina.

Also, for the first time, individual squirrels have been found using dens on both sides of the Skyway. Prior to the installation of the crossing structures, flying squirrels did not cross this road.

"Carolina Northern flying squirrels have been documented using and exploring all six poles in three corridors along the Skyway," said Chris Kelly, a biologist with the commission. "Spring and summer seem to be the peak time for dispersal, though we also have documented flying squirrels crossing in fall and winter, even during a snow storm."

NCWRC

For the first time, endangered Carolina Northern flying squirrels have been documented using d both sides of the Cherohala Skyway thanks to crossing structures.

NCWRC

The crossing structures, wood poles donated and installed by Duke Energy in 2008, allow the small mammals to access more foraging habitat, den sites and mates. Northern flying squirrels move by gliding from tree to tree, but the width of the canopy gap across the Skyway exceeds their gliding ability. This created two populations on either side of the road.

Reconnecting the populations leads to improved gene flow with less risk of genetic impacts and less vulnerability to catastrophic events, such as loss of habitat. Carolina Northern flying squirrels differ from their cousin, the Southern flying squirrel, in that they inhabit spruce-fir and northern hardwood forests in just eight high-elevation areas of the state. The Southern flying squirrel is common throughout the state in urban and forest areas at low to mid-elevations.

The N.C Department of Transportation, U.S. Forest Service, Duke Energy, U.S. Fish and Wildlife Service, and the Wildlife Commission worked together to successfully resolve this wildlife crossing issue by designating movement corridors along the Skyway. They posted these segments with "Do Not Mow" signs to promote tree growth so the poles can eventually be removed.

To evaluate the success of the structures, scientists mounted wildlife cameras to the pole tops. Video monitoring of the poles was assisted by volunteer Caleb Heimlich, who helped with camera checks, and N.C. State University student Andy Lawrence as part of his undergraduate research in the Fish and Wildlife program.

North Carolinians can support this as well as other nongame species res and management projects in North Ca through the Tax Check-off for Nongan Endangered Wildlife. Checking line No a state tax form lets taxpayers designa or all of their state tax refunds to this Since 1984, taxpayers have given mor $8 million for wildlife conservation th this funding mechanism.

Tax season isn't the only time to gi wildlife. Other ways to help North Car wildlife and their habitats year-round

- Donate online at www.ncwildlife.or
- Round up purchases at any of thre Wild Stores;
- Register a vehicle or trailer with a Wildlife Conservation license plate
- Volunteer to help commission sta nongame-related projects.

For more information on Northern squirrels in North Carolina, visit www.ncwildlife.org/give/WD_Proje htm#n_flying_squirrel.

e NEWSLETTER
Get N.C. Wildlife Update—news including season dates, bag limits, legislative updates and more—delivered to your Inbox from the N.C. Wildlife Resources Commission. Sign up at www.ncwildlife.org/enews.

mmission Approves New Regulations

N.C. Wildlife Resources Commission s approved proposed changes to the unting, fishing and trapping regu- for 2011–2012.

owing a process of reviewing public nts received online, by letter and at blic hearings across the state, the com- n voted on the proposed regulation s at its Nov. 4 meeting.

proposals presented at the public hear- re adopted by the commission with a ior changes, which included:

rifying language in rules that define types of traps and trapping equipment.

esponse to public comment, changing es and adding limited months into a t will create a class of roads on game at are open only from 5 a.m. to 10 p.m. he months of June, July and August. oads shall be posted with the opening sing times.

proving an adjustment to the down- boundary of the Delayed Harvest portion of the Tuckasegee River in Jackson County as a result of considerable public opposition to the originally proposed boundary at the U.S. 23-441 bridge. The new boundary is proposed to be the falls located approximately 275 yards upstream of the U.S. 23-441 bridge and just upstream of site of the demolished Dillsboro dam. The boundary will be conspicuously marked by a sign on each bank.

The commission also approved an increase in the minimum size limit for spotted seatrout in inland fishing waters from 12 inches to 14 inches; the daily creel limit remains 10 fish per day. In addition, a 12-inch minimum size limit and a one fish daily creel limit were established for gray trout in inland fishing waters.

Other hunting, fishing and trapping proposals were adopted as presented at the public hearings in September. For the full text of the original proposals download the 2010–11 Public Hearings booklet at www.ncwildlife.org/Regs/documents/PubHearBook11-12_072810.pdf.

Cape Fear Receives Striped Bass Stockings

elp boost the striped bass fishery in Cape Fear River, the N.C. Wildlife es Commission has stocked more than) stripers, ranging in length from 4 to s. The fish were produced at the ssion's Watha State Fish Hatchery in County.

DUANE RAVER ILLUSTRATION

commission has stocked striped bass us sizes in the Cape Fear River on an basis since 1998; however, this is the cking of fish that were produced using sh collected exclusively from the Cape ver. All previous stockings were from sh collected from the Roanoke River. hope is that by stocking fish raised rents collected from the Cape Fear, the imprint to the system and return years adults to spawn," said Keith Ashley, a s biologist with the Wildlife Commis- ivision of Inland Fisheries.

ed bass migrate into the Cape Fear om the Atlantic Ocean each spring. ng in 2003, the commission initiated ual survey of the Cape Fear River striped bass stock. The objective was to obtain up-to-date information on the abundance, distribution, length, age and sex composition of striped bass collected from the Cape Fear River population.

Survey results continue to document low numbers of spawning adults and poor recruitment. In an attempt to promote recovery of the fishery, the N.C. Division of Marine Fisheries (DMF) and the commission implemented a moratorium on recreational and commercial striped bass harvest in the Cape Fear River system in 2008.

"We hope that the harvest moratorium, in conjunction with this new stocking program, will ultimately result in the restoration of this important fishery on the Cape Fear River," Ashley said.

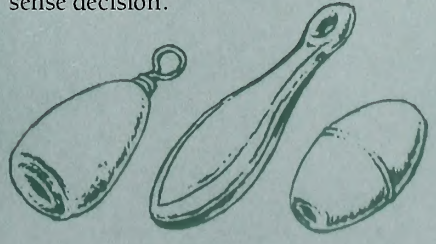
EPA Denies Bid for Lead Ban in Fishing Gear

The U.S. Environmental Protection Agency (EPA) has denied a petition calling for a ban on the manufacture, use and processing of lead in fishing gear.

In a letter to the petitioners, EPA indicated that the petitioners have not demonstrated that the requested rule is necessary to protect against an unreasonable risk of injury to health or the environment, as required by the Toxic Substances Control Act (TSCA). The letter further indicates that the increasing number of limitations on the use of lead fishing gear on some federal and state lands, as well as various education and outreach activities, call into question whether a national ban on lead in fishing gear would be the least burdensome, adequately protective approach to address the concern, as called for under TSCA. EPA's letter also notes that the prevalence of nonlead alternatives in the marketplace continues to increase.

On Aug. 3, 2010, the American Bird Conservancy and a number of other groups petitioned EPA under Section 21 of the Toxic Substances Control Act to prohibit the manufacture, processing, and distribution in commerce of lead for shot, bullets, and fishing sinkers." On Aug. 27, 2010, EPA denied the portion of the petition relating to lead in ammunition because the agency does not have the legal authority to regulate this type of product under TSCA.

"The sportfishing community applauds EPA's decision," said Gordon Robertson, vice president of the American Sportfishing Association. "It represents a solid review of the biological facts, as well as the economic and social impacts that would have resulted from such a sweeping federal action. It is a common sense decision."



IN SEASON

This month, these seasons are open in North Carolina:

Black Bear: See *Regulations Digest* for seasons and locations.
Bobcat: Through Feb. 28.
Brant: Through Jan. 29.
Canada Goose and White-Fronted Goose: Resident Population Zone through Feb. 5; Northeast Hunt Zone (permit only) Jan. 22–29.
Common Snipe: Through Feb. 26.
Crow: Through Feb. 28.
Ducks, Coot and Mergansers: Through Jan. 29.
Fox: See *Regulations Digest* for seasons and locations.
Light Geese (Snow, Blue and Ross'): Through March 9.
Mourning Doves and White-Winged Doves: Through Jan. 14.
Pheasant: Through Feb. 1.
Quail: Through Feb. 28.

Rabbit: Through Feb. 28.
Raccoon and Opossum: Through Feb. 28.
Ruffed Grouse: Through Feb. 28.
Sea Ducks: Through Jan. 31.
Squirrel: Gray and red through Feb. 28.
Tundra Swan: Through Jan. 31 (permit only).
White-tailed Deer:
Eastern: Gun season through Jan. 1.
Central: Gun season through Jan. 1.
Northwestern: Gun season through Jan. 1.
Wild Boar: Through Feb. 28 only in Cherokee, Clay, Graham, Jackson, Macon and Swain counties. In the other 94 counties of the state, feral hogs are not considered to be wild boars, and the commission does not regulate them.
Woodcock: Through Jan. 29.

There is no closed season or bag limit for groundhog, coyote, striped skunk, nutria and armadillo. There is an open season for taking beaver with firearms or bow and arrow during any other open season for the taking of wild animals.

Check the *2010–2011 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

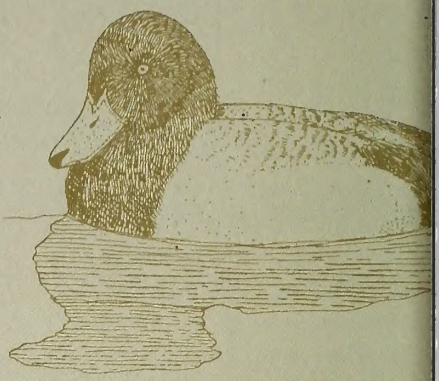
CALENDAR OF EVENTS

Friday–Sunday, January 7–9

Check out the latest rods, reels, lures and other fishing gear at the Bass and Saltwater Expo at the State Fairgrounds in Raleigh. Event also includes boat dealers and seminars with professional fishermen. Visit www.ncboatshows.com.

Saturday, January 15

Learn about wintering waterfowl on the Currituck Sound with staff from the Outer Banks Center for Wildlife Education. Call (252) 453-0221, extension 3. Visit www.ncwildlife.org.



Readers should check with the contact listed befor ing to an event. Items for listing should be conse oriented and should be submitted at least four m advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

Deer Season Evaluation Will Guide Future Chang

The N.C. Wildlife Resources Commission has adopted a statewide goal for manage of deer and deer hunting that incorporates biological and nonbiological consider for evaluating deer season regulation change proposals.

The commission's goal will "use science-based decision making and biologically management principles to assure long-term viability of deer populations at desirable of health, herd composition and density with regard to land cover type and use, h satisfaction and overall social acceptance."

The evaluation process, while not a rule change in itself, will guide agency staff in uating new deer season regulations. Agency staff will measure each new proposal ag set of biological and nonbiological principles before they go before the N.C. Wildlife Res Commission and potentially to public hearings. The process is intended to create a con means for evaluating new proposals that encompasses all aspects related to the manag of the deer herd and deer hunting throughout the state.

Agency staff will evaluate each proposal's effects on biological aspects such as r bucks to does harvested and ages of the deer harvested. Under the process, the agenc also look at aspects such as fiscal impacts, level of support from hunters and imp hunter retention and recruitment.

For more information on the commission's rulemaking process, download "From Pr to Regulation" at www.ncwildlife.org/Regs/documents/PubHearBrochure.pdf.

MELISSA MCGAV

The Wildlife Endowment Fund

An Investment for the Future

Established in 1981, the Wildlife Endowment Fund allows the Wildlife Resources Commission to accept tax-deductible contributions for wildlife conservation. Money from the sale of lifetime licenses is also placed in this fund. Your donation or purchase will ensure that North Carolina will have a rich wildlife heritage for generations to come.

Lifetime License Form

Infant and Youth *(check oppropriote block)*:

- ☐ Sportsman Infant $200
  (under 1 year old—Application must be received before applicant has attained 1 year of age.)
- ☐ Unified Sportsman/Coastal Recreational Fishing Infant $275
  (under 1 year old—Application must be received before applicant has attained 1 year of age.)
- ☐ Sportsman Youth $350
  (ages 1 through 11—Application must be received before applicant has attained 12 years of age.)
- ☐ Unified Sportsman/Coastal Recreational Fishing Youth $450
  (ages 1 through 11—Application must be received before applicant has attained 12 years of age.)

A copy of the birth certificate must accompany applications for infant and youth licenses. Birth certificate documentation cannot be returned.

Note: Pending satisfactory completion of the hunter safety course, persons who possess infant or youth licenses may exercise the privileges thereof when accompanied by an adult who is properly licensed to hunt in North Carolina. "Accompanied" is defined as maintaining a proximity to the hunter which enables the adult to monitor the activities of, and communicate with, the hunter at all times.

Adult (age 12 or older) *(check oppropriote block)*:

- ☐ Comprehensive Inland Fishing. $250
  (N.C. residents only—includes basic inland fishing, trout & trout waters on game lands)
- ☐ Comprehensive Hunting. $250
  (N.C. residents only—includes basic hunting, big game, game lands & N.C. waterfowl)
- ☐ Sportsman. $500
  (N.C. residents only age 12 or older—includes basic hunting & inland fishing, big game, game lands, trout & N.C. waterfowl)
- ☐ Coastal Recreational Fishing $250
  (N.C. residents only—includes caastal recreatianal fishing)
- ☐ Unified Sportsman/Coastal Recreational Fishing $675
  (N.C. residents only—includes same privileges as the Spartsman, plus coastal recreational fishing)

A federal waterfowl stamp must be purchased separately for all N.C. hunting licenses.

Note: On or after July 1, 1991, a person, regardless of age, may not procure a hunting license or hunt in North Carolina without producing a certificate of competency for completing the hunter safety course or a hunting license effective prior to July 1, 1991, or by signing the statement below that he or she had such a license.

Check appropriate block and attach required copy:

- ☐ Copy of Prior Year Hunting License
- ☐ Copy of Hunter Safety Certificate of Competence
- ☐ In lieu of copy, I am signing the statement below:

Statement: I certify that I was a licensed hunter prior to July 1, 1991.

Signature _____ Date _____

Visit us online at www.ncwildlife.org or call 1-888-248-6834 for a complete list of lifetime licenses, including those for nonresidents and 65 and older.

Lifetime License

Complete the following information if applying for a lifetime license. Be sure to check appropriate block(s) on reverse side *(please print legibly)*:

Name of Applicant _____

Daytime Phone _____

Mailing Address _____

Resident Address _____

County _____ Date of Birth _____ Driver License # _____

E-mail Address _____

Is this license a gift? ☐ Yes ☐ No If yes, mail license to ☐ Donor or ☐ Applicant.

License Donor's Name *(if applicable)* _____

Donor's Telephone # _____

Donor's Mailing Address _____

City _____ State _____ Zip _____

Method of Payment: ☐ Check ☐ VISA ☐ MasterCard

Acct. # _____ Expires _____

Print name exactly as it appears on credit card _____

Cardholder's Signature _____ Date _____

Personalize your Lifetime License for an additional $5:
Indicate your selection of letters, numbers, dashes, periods, commas and /or blanks up to 6 spaces: ___ ___ ___ ___ ___ ___

Indicate your personal message including letters, numbers, dashes, periods, commas and /or blanks up to 21 spaces:

___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
___ ___ ___ ___ ___ ___ ___ ___ ___ ___

Signature of Applicant or Donor _____ Date _____

Note: Only adult lifetime licenses may be purchased by phone or online (VISA or MasterCard only). Call toll-free (1-888-248-6834) or visit us at www.ncwildlife.org. Use this form to purchase infant and youth lifetime licenses by mail.

Tax-Deductible Contribution

☐ I wish to make a tax-deductible contribution to the Wildlife Endowment Fund. Enclosed is my check for $_____. *(Credit card payments cannot be accepted.)*

Name _____

Daytime Phone _____

Mailing Address _____

City _____ State _____ Zip _____

Make checks payable to: *Wildlife Endowment Fund*

Transactions are not considered final until the check has cleared the bank. Items purchased with a returned check will be made invalid. A service charge of up to $25 will be charged on any returned check. (N.C.G.S. 25-3-506)

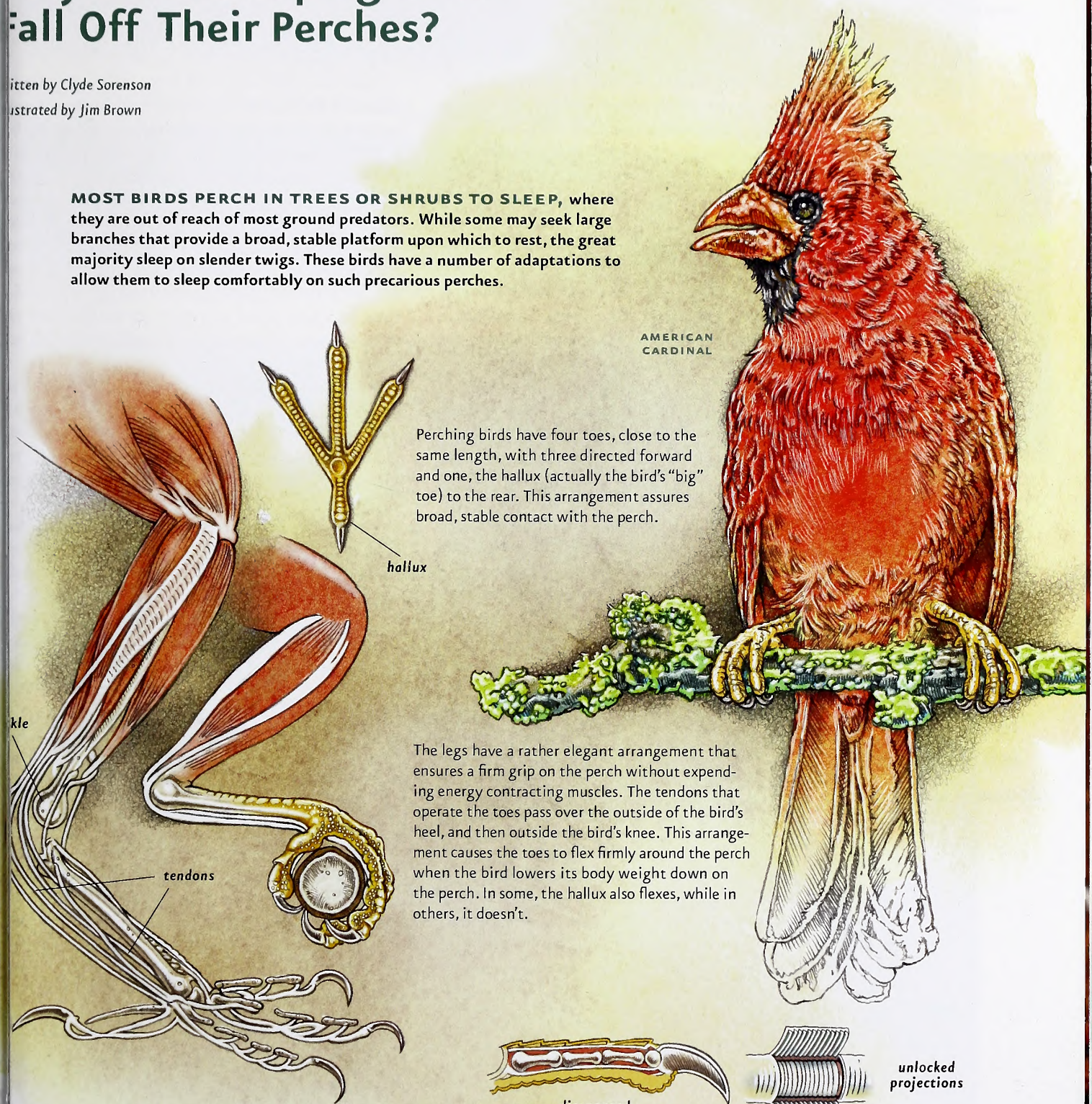
Mail completed application and payment to:
NCWRC, License Section, 1707 Mail Service Center, Raleigh, NC 27699-1707

Office location: *NCSU Centennial Campus, 1751 Varsity Drive, Raleigh, N.C. 27606*
Telephone: 1-888-248-6834 (2HUNTFISH)

Why Don't Sleeping Birds Fall Off Their Perches?

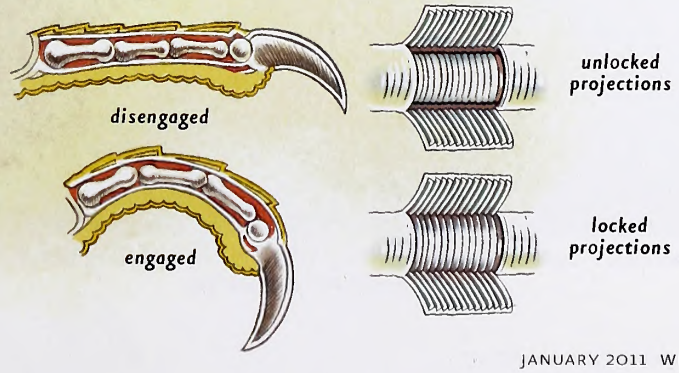
itten by Clyde Sorenson
ıstrated by Jim Brown

MOST BIRDS PERCH IN TREES OR SHRUBS TO SLEEP, where they are out of reach of most ground predators. While some may seek large branches that provide a broad, stable platform upon which to rest, the great majority sleep on slender twigs. These birds have a number of adaptations to allow them to sleep comfortably on such precarious perches.



Perching birds have four toes, close to the same length, with three directed forward and one, the hallux (actually the bird's "big" toe) to the rear. This arrangement assures broad, stable contact with the perch.

The legs have a rather elegant arrangement that ensures a firm grip on the perch without expending energy contracting muscles. The tendons that operate the toes pass over the outside of the bird's heel, and then outside the bird's knee. This arrangement causes the toes to flex firmly around the perch when the bird lowers its body weight down on the perch. In some, the hallux also flexes, while in others, it doesn't.



Further securing the bird, in many species, are tiny projections on the tendons in the toes. These little knobs engage with striations in the tendon sheath when the bird lowers its weight, locking the tendons in place much like the cog on a boat trailer winch. The bird can easily disengage this "locking mechanism," should it need to, by flexing some leg muscles.

Ice Storm

written by Jim Dean

No one who lived in the wide path of Hurricane Fran back in 1996 is likely to forget the damage it wrought — trees and power lines down everywhere, roofs crushed and roads blocked. Electricity was off for a week, considerably longer in some areas. Chain saws buzzed constantly, and nearly every roof sported temporary blue tarps. Those fortunate enough to have generators at least had lights and perhaps enough power to keep a refrigerator cool, but most of us fired up grills and cooked everything we had stored in the freezer.

JODY DUGGINS/NCWRC

Tractor-trailer trucks delivered bags of free ice to shopping centers, and many supermarkets gave away perishable food. Only the mosquitoes seemed to prosper in the unseasonably sticky heat that followed that September storm. It took months before life really returned to anything near normal, but at least we didn't nearly freeze to death.

"Some of the condiments in the kitchen cabinets were frozen, and the bedrooms were colder than a Siberian labor camp."

Even so, for sheer misery, a major ice storm may be just about as bad, and the one that crippled much of North Carolina's Piedmont in 2002 was particularly memorable. Overnight temperatures stayed well below freezing, and authorities were predicting that it might be a week or more before electricity was restored. I had flashlights, but no way to cook inside, and I spent the first two days huddled in front of the fireplace.

When we thought the roads might be clear, my son Scott and I decided to see if we could make it to our family farm in Granville County where we had refurbished an old cabin as a fish camp. There hadn't been any electricity there for many years, but we could pick up a Coleman two-burner stove and lantern, as well as some oil lamps.

Several times, we had to go off-road in my old Bronco to avoid downed trees and power lines, and when we got to the farm, the mile-long path to the cabin was an impassable tangle of fallen pines. We broke through the thick crust walking across frozen fields. It was tough going, and I kept thinking of a line Johnny Mercer wrote for the jazz classic "Midnight Sun." Truly the world was "an alabaster palace, icy white and crystalline." But we managed to retrieve the stove, lantern and lamps.

Scott was able to get back to his job in Ohio the following day, and now I had lights and a stove. But no matter how many quilts and blankets I piled on the bed at night, I was still cold. Then I had what seemed to be a wonderful idea. Dad was only minutes away in an independent living facility where generators supplied heat and electricity. Why not spend nights with him?

He was delighted to have company, and that evening I headed to his place with a sleeping bag, pillow and air mattress. We sat around talking until bedtime, by which time I was warm for the first time in days. Maybe a bit too warm, I thought, as I rolled out my bedding.

I climbed out of the sleeping bag and lay on top of it, but it was still stifling. I checked on Dad to see if he minded whether I might cut the heat back a bit. He was snoring happily under every blanket in the place, bless his heart. The thermostat was set at more than 90, and the heat ran constantly.

Maybe, I thought, if I get in the closet it might be a bit cooler. I pushed Dad's shoes aside, moved my bedding and closed the closet door. I might as well have climbed into Dante's Inferno. Finally, about 2 o'clock in the morning, I realized this wasn't working. I was buck naked and sweating, but Dad was comfortable and I didn't have the heart to cut down the heat. I woke him to tell him that I thought I needed to go home.

"I might need to be there just in case," I explained. "Pipes might burst, or something." Dad mumbled an OK and burrowed deeper under his blankets. I didn't mention that I was well aware that every pipe in my house could split without any water running loose.

I drove home dodging patches of black ice. Some of the condiments in the kitchen cabinets were frozen, and the bedrooms were colder than a Siberian labor camp. I built a roaring fire in the fireplace, closed off as many doors as I could to keep the heat in the den, and tried to sleep under a 3-foot pile of blankets. My nose was a block of ice.

A few days after the electricity finally came back on, I called Scott to give him an update.

"You know, I've been thinking," Scott remarked. "You should have stayed right there in the cabin at the farm. You had a wood stove, a wood cook stove, plenty of firewood, lamps, food, water, books to read and everything else anyone would have needed to be comfortable 100 years ago."

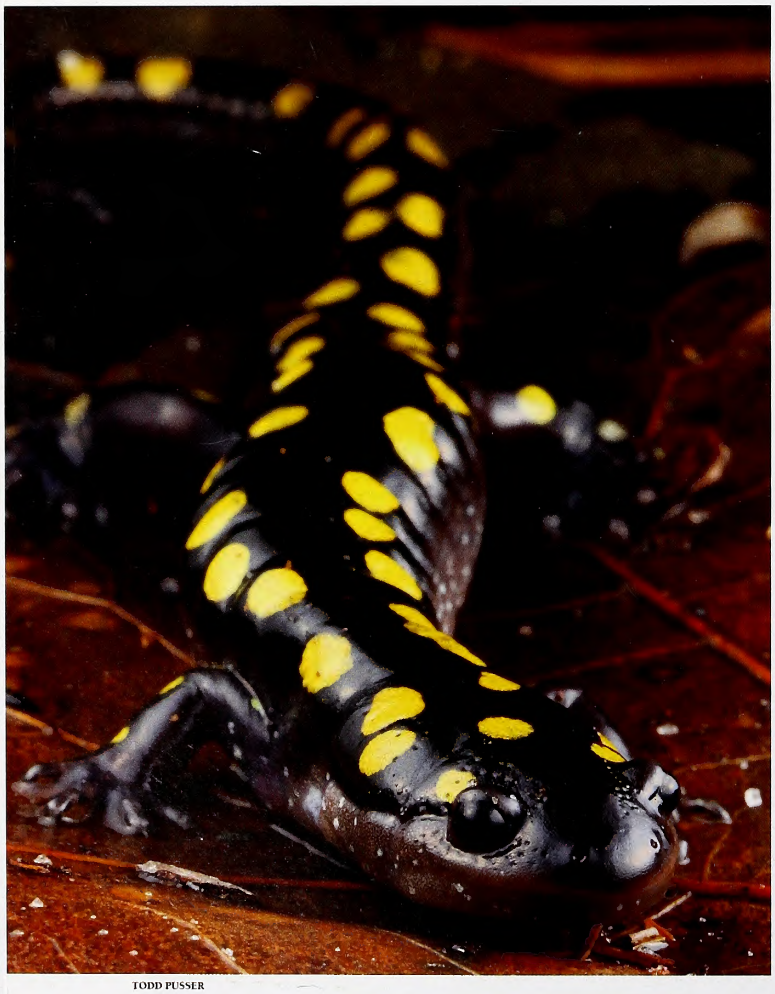
Yeah, but did they have dope-slaps for idiots back then, too?

GEORGE BISSINGER

OUTDOOR MOMENT

Ruddy duck, Mattamuskeet NWR. Entered in the Birds category of the photo competition.

IN THE FEBRUARY ISSUE



TODD PUSSER

◀ **SPOT SEARCH**
Late-night excursions to witness spotted salamander mating prove to be addictive.

TEARING DOWN
Dam removal is a prime method of improving wildlife habitat and human recreation.

WOOD SMOKE
The state's top renewable energy source might be growing in our forests and farms.

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Product group from well-managed forests, controlled sources and recycled wood or fiber
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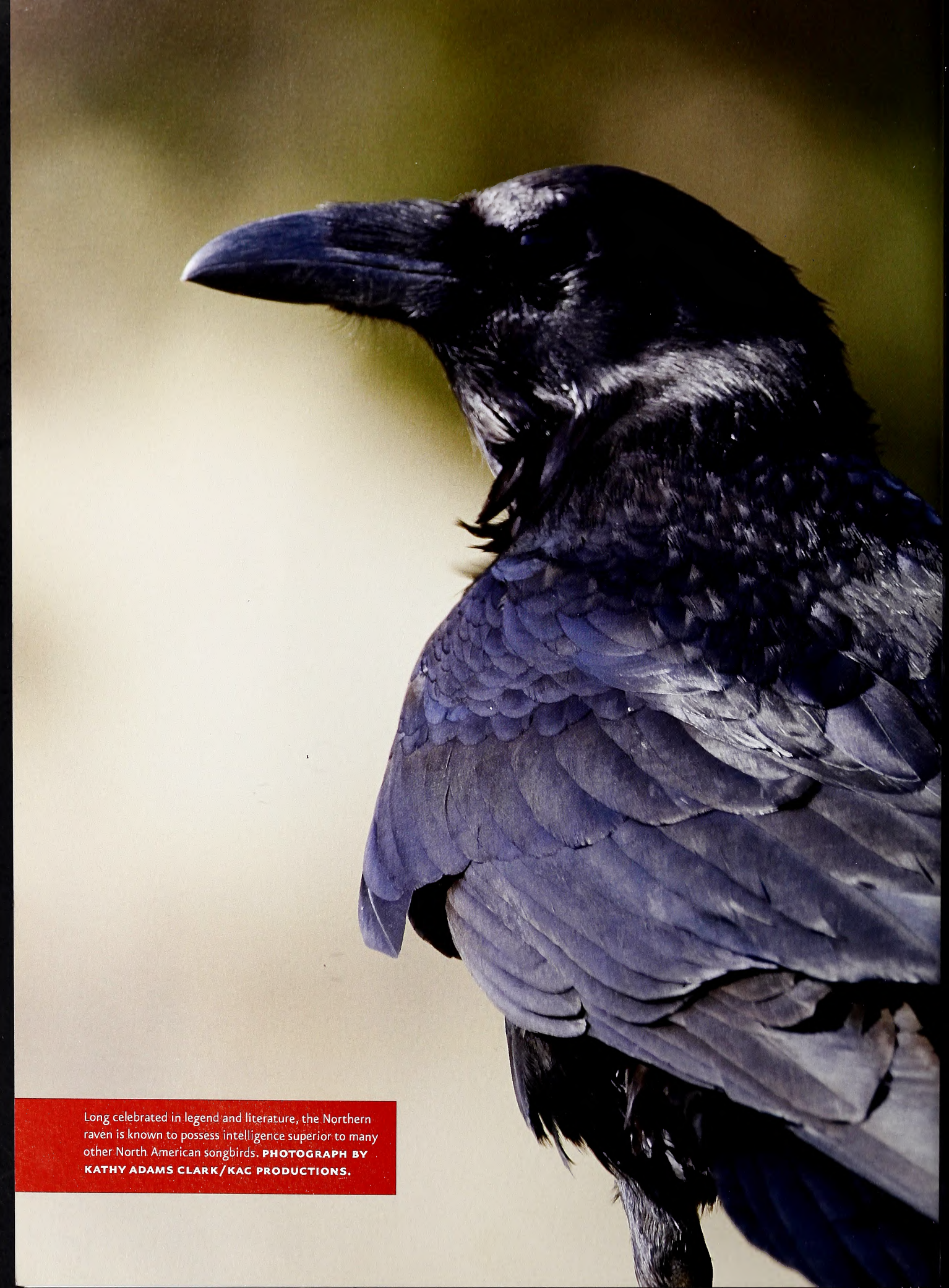
WILDLIFE IN NORTH CAROLINA

NORTH CAROLINA Wildlife RESOURCES COMMISSION



Long celebrated in legend and literature, the Northern raven is known to possess intelligence superior to many other North American songbirds. **PHOTOGRAPH BY KATHY ADAMS CLARK/KAC PRODUCTIONS.**

Volume 75 | Number 2

WILDLIFE IN NORTH CAROLINA

contents | february 2011

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FEB 03 2011

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written by William H. Funk
Northern ravens have long been known for their intelligence and complex social relationships. The author sought them out on Pilot Mountain to lift his spirits.

10 **STILL WALKER**
written by Shari Smith | illustrated by Karen Lee
What are little boys made of? Spiders and frogs and lightning bugs, that's what little boys, and the grown-ups they become, are made of.

14 **THE BIOMASS ENDEAVOR**
written by Steve Wall
North Carolina's energy future might be found in its forests and on its farms.

20 **THE MATING DANCE OF THE SPOTTED SALAMANDER**
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Neither cold nor wet nor dark of night can keep this amateur herpetologist from his appointed rounds.

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Cover: Spotted salamanders mate on dark, wet, cold February nights. To see this phenomenon requires much preparation and dedication.
PHOTOGRAPH BY TODD PUSSER.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

Many of our outdoor expeditions are spent searching. We look for certain animal species that we like to hunt, add to our life list, photograph or simply watch. We plan entire journeys around the animals that fascinate or inspire us.

Bill Funk is one of those searchers. Funk is an environmental lawyer turned aspiring filmmaker who spent his share of time in the corporate grind. In his article "Raven Renewal" on page 4, Funk weaves a tale of how he sought these large black birds to pull him out of a dark mood. As is often the case when we seek wild animals, Funk's spirits were elevated when he simply heard ravens calling. Once he saw these majestic creatures, he felt as sky-high as they flew.

MASLOWSKI WILDLIFE PRODUCTIONS

Bob Palmatier is another searcher. His preference leans toward cold, wet February nights when spotted salamanders procreate ("The Mating Dance of the Spotted Salamander," page 20). Palmatier realizes that when you seek something unique and amazing, sometimes you have to put personal comfort and convenience aside to experience it firsthand.

The ranks of searchers also include conservationists. Scientists are looking for ways to convert wood and grasses into biofuels ("The Biomass Endeavor," page 14). It's the quest for the ultimate renewable energy source. It would be incredible if science could engineer a way for the plants growing around us to provide our energy needs. Others are searching for dams to remove in order to restore rivers and their wildlife to natural states ("Removing Dams, Restoring Rivers," page 26). Dam removal has worked wonders restoring riverine habitat in North Carolina. The goal now is to target the dams that will make the most difference, and pick up the pace.

Shari Smith doesn't need to search for her little boy who loves nature ("Still Walker," page 10). Even though he is a 6-foot-7 high school senior and basketball star, she continues to see in him that same fascination with nature that inspired him to name his stuffed animals after North Carolina landmarks. It just goes to show that although we might search from the time we are children until our release back into dust, our quest never comes to an end. It is a journey in which we find what we search for again and again, and after we are gone, we hope to hand off a similar quest to the next generation.

Greg Jenkins

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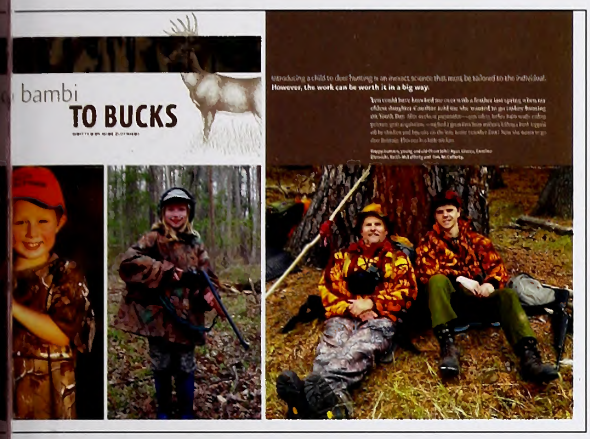


r Training

lotnicki's article on introducing chil- deer hunting was excellent ("From o Bucks," Nov. 2010). We need to teach dren about nature, even if they never hunting. I raised my son to be a hunter e been involved with the "education" of us other young men and women. I now o young grandchildren I'm working on. e only 4 and 6 and I am trying to instill in n appreciation for our natural world by tly pointing out to them different plants mals and explaining what they do and ey live. One day, I hope they have an in hunting, but that will be up to them. y agree with introducing children to t at a fairly early age, using the methods ed in the article. I also believe that they not actually hunt until at least 10 or 12 d. Until a child has a firm understanding errible power that exists in a gun, and ey fully comprehend what they have nen they have taken the life of one of eatures, they should not be permitted to observation from my experience with hat, while it's easy for a young child to w to sit in a stand, look through a scope eeze a trigger, it is impossible for some- ler 10 years old to understand how pre- life is, including the one he just snuffed s impossible for a child to have the soul ıter.

thing I found most difficult to explain ren is, simply, why we hunt. In days gone by, when man hunted to live, children began hunting and trapping at a very early age to put food on the family table. But today we are not subsistence hunters, we are sport hunters — we hunt and kill for fun. We should not fool ourselves or our children into thinking otherwise. Yes, we eat what we kill, we waste as little as possible, we are "managing" the excess population of an overabundant herd, preventing car wrecks, and all those other justifications we use, but the fact is, we do not have to hunt and we would not starve if we didn't. We simply love the thrill of the kill.

In teaching a child to hunt, just as important as the wood lore, the shooting skills, and all the other "how-tos," is the why — and a deep appreciation of God's gifts of nature. If we don't teach that, we have trained a killer, not a hunter.

Fred C. Atkins
Cary

Plotting a Course

One nice thing about getting older is that the mundane when one is younger becomes unique and important as we age. I loved Bob Plott's article about his family's history with the Plott hound ("A Breed Apart," Dec. 2010). As a child, I was the one in our family responsible for feeding Daddy's hounds — bear hounds, and an occasional Plott, and there were a lot of them. We lived on the side of a small mountain in the Haw Creek area of Asheville. My dad was a true mountain man, and hunting bear all winter was a given for him except when he was refereeing basketball games in western N.C. The two are similar in that both required much stamina.

There were certain parameters set for me as the hounds' caretaker: Never make a pet out of any of them. Never let them run loose because we would never see them again. Lastly, never get entangled with their chain, because it would really hurt me. My sister and I always tried to please Daddy because we felt sorry that he had no boys to do these manly things he enjoyed. Doing "boy" things was fun to us.

One time he woke me in the night to go down to the basement and watch him skin a bear. He took his knife and cut from its neck to its hind legs. Instead of blood (there was not a drop), all this pure white fat appeared through the cut like Daddy was opening a zipper. Our freezer was always full of bear meat, and to this day, I can smell it cooking. Yuck!

Great tales came back of chasing after the dogs. The men would go up the mountain to the ridge line and follow the sound of the dogs below. Their distinctive baying when they had a bear treed signaled them to rush down the mountain to shoot their prey or save the precious and expensive dogs. As Plott's article stated, the dogs were relentless and would fight to the death if not saved by their owners.

The independence learned in my youth, the responsibilities we endured, and they were numerous, created in me a strong spirit as a woman. This is where these seemingly strange memories have deep value to me today. I am forever grateful, even for those Plott hounds.

Diane Crenshaw Roberts
Lake Wylie, S.C.

I just read your story about the Plott hounds. My dad and mom, Roy and Kathy Wilson, owned the Blue Boar lodge here in Robbinsville for about 20 years. My dad had one of the best houndsman and hunter that worked for them — Ronnie Creasman from Jackson County. He had hunted with Von Plott and Taylor Crockett. I have listened to so many stories about the Plott family and their dogs. Roy and Ronnie have passed away now, but their memories and hunting stories live on forever in my mind. There is more to the Plott history than anyone will ever know. I would like to thank you for the story that was in the magazine. It brings back so many memories about how my dad and Ronnie loved their dogs. They hunted with all breeds, but they always had Plotts in their pack.

Rex Wilson
Robbinsville

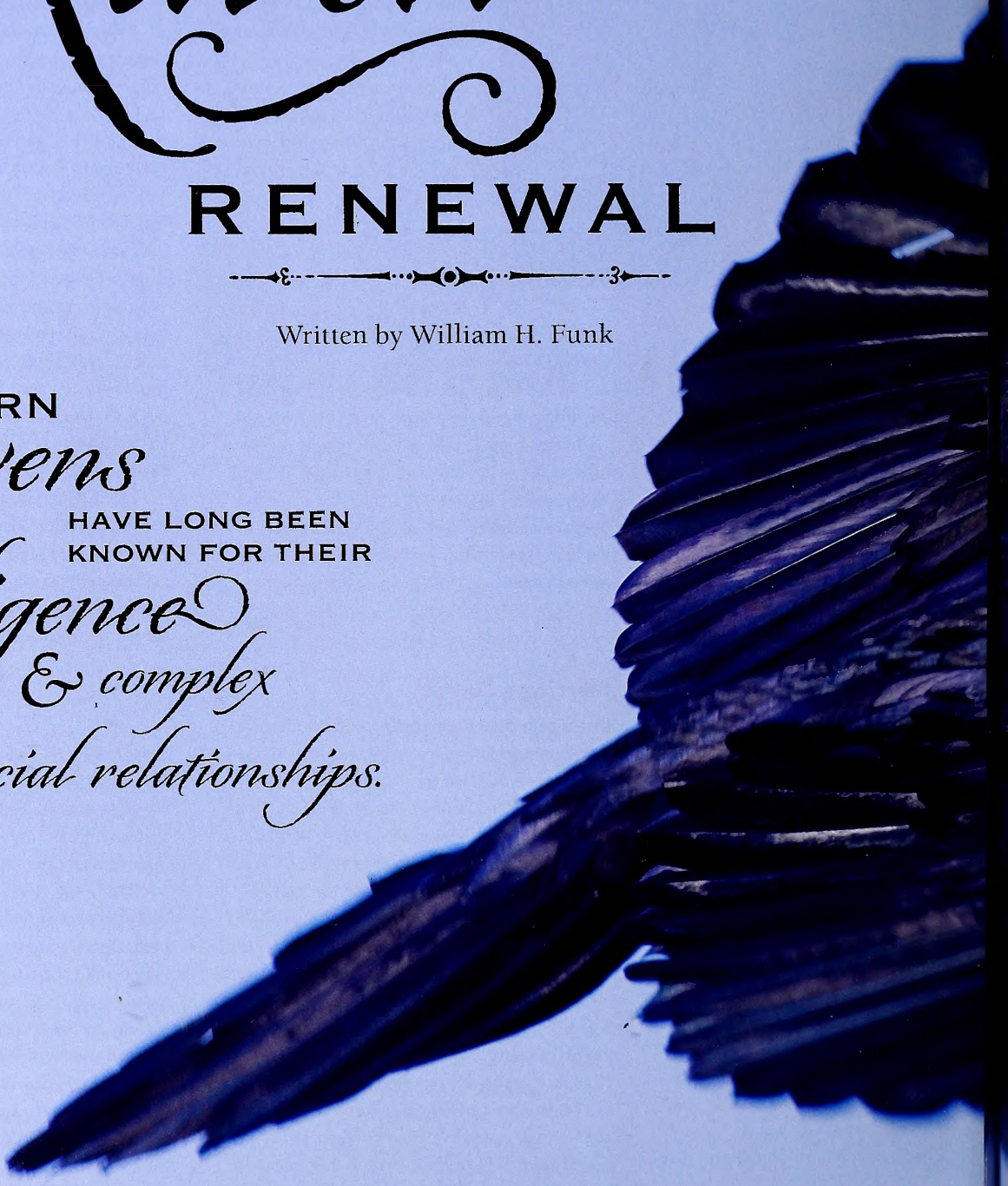
rite us

tters should be sent via e-mail to **letters@ncwildlife.org** ar thraugh regular mail ta Letters, Wildlife in North Carolina magazine, 1712 Mail Service Center, Raleigh, NC 27699-1712.
ease include yaur name, address and daytime phone number. Letters chasen far publicatian may be edited for clarity and length.

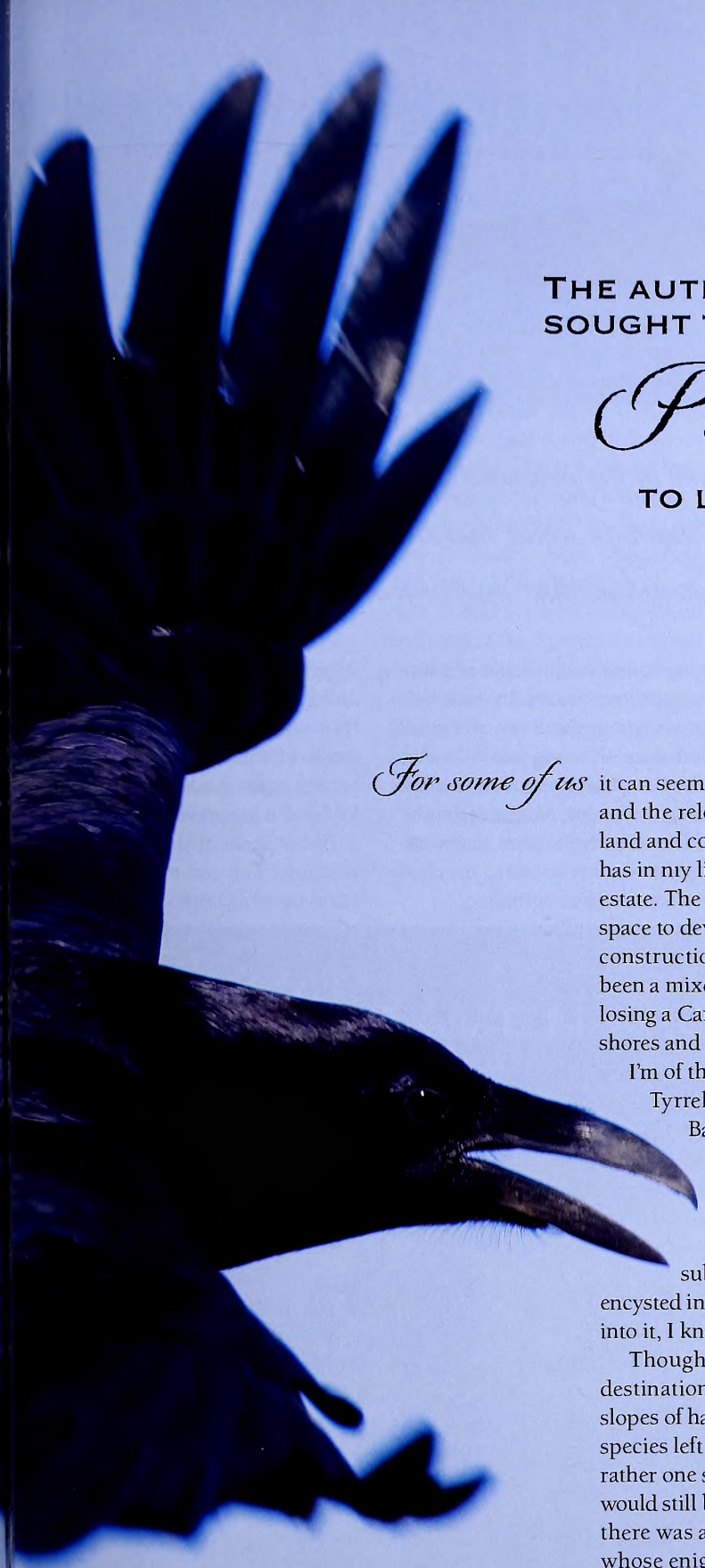
Raven RENEWAL

Written by William H. Funk

NORTHERN *ravens* HAVE LONG BEEN KNOWN FOR THEIR *intelligence & complex social relationships.*



MASLOWSKI WILDLIFE PRODUCTIONS



THE AUTHOR SOUGHT THEM OUT ON *Pilot Mountain* TO LIFT HIS *spirits.*

For some of us it can seem, in this hyperkinetic world of universal homogenization and the relentless development of our remaining mountains, farmland and coastlines, that everything is going to hell. North Carolina has in my lifetime become the hottest commodity in East Coast real estate. The influx of newcomers and the resulting conversion of open space to development have been well and good for our friends in the construction and agribusiness industries, but they have definitely been a mixed blessing for those who might recall and perhaps regret losing a Carolina of quiet Piedmont farms bracketed by uncluttered shores and the verdant Blue Ridge.

I'm of the latter mindset, myself. My aunt and uncle had lived in Tyrrell County all of my life, and their proximity to the Outer Banks had made their home the natural destination for my mother's side of the family for summers that stretched back to the mid-1970s. I moved to Raleigh shortly after law school partly to be close to these favorite relatives and also to revisit a state that had long ago claimed a substantial piece of my heart, only to find myself unhappily encysted in an upwardly immobile government position. A few weeks into it, I knew I needed a break.

Though I'd long ago given up on the Outer Banks as a spiritual destination, there was still the mountainous west, those long blue slopes of hardwood climbing to spruce-fir stands that harbor endemic species left anchored there since the last glaciers. The Mountains, or rather one stumpy sentinel squatting alone in the western Piedmont, would still be home to some of the old restorative magic. What's more, there was a peculiar visit I hoped to make, a call on an old friend whose enigmatic comfort I had periodically found up in the wilds of New England during those bleak years of self-induced suffering through the boot camp of law school.

May Day, 2000 AD I negotiate my way through the customary madness of the I-40 morning rush hour. Suddenly, as if escaping the clutches of an ebb tide, I am ejected into the undulating pastoral calm of northern Forsyth County, following U.S. 52 north to Pilot

LARRY DITTO/KAC PRODUCTIONS

When walking in raven country, we are in the presence of an intelligent and enterprising tribe of beings with a language, social hierarchy and network of personal relationships that mirror our own.

Mountain to visit with my old friend. I'm not expected, but I hope the reception will nonetheless be as open and generous as in years past. I am in need of the kindness of strangers, and few of our fellow creatures are as strange and alluring as the Northern raven.

Weeks previously, feeling the need for solitude and natural reconnection that periodically afflicts me when I find myself boxed into cubicles and concrete office buildings, I had done some cyber-snooping and learned that ravens were endemic to Pilot Mountain in a small population that nested on the pinnacle's naked stone flanks. I was driving to Pilot Mountain State Park for the express purpose of viewing wild ravens—the crow's bigger brother and the largest songbird in North America. I'd been beguiled by the raven's size, stature, good looks and applied intelligence since first encountering the species in various places in the West, and then more intimately during my postgraduate stint in New England. Something about their ominous call, their carved cruciform shadow in the sky and their general reluctance to deal overmuch with the doings of mankind spoke to my somewhat misanthropic mindset (law school will do that to you) and made an indelible mark on my consciousness.

For years after graduation I would in times of stress recall the strange peace I'd felt when, deep in the north woods of Vermont, that distant croaking yelp floated down to me from above, signaling the presence of a kindred spirit somewhere nearby. In those tremulous days of angst and anxiety over grades and a future career, the long solo hikes I'd taken into the Green Mountains were a necessary solace, and when, as was often the case, I was blessed with a raven's accompaniment along the way, my return to the classroom was that much more agreeable.

A previous raven search, to the enticingly named Raven Rock State Park in Harnett County, had been a wonderful time spent rambling over the overhanging cliffs along the Cape Fear River but produced no ravens, the park's titular species having been driven out by logging decades ago. I chose Pilot Mountain for my next raven pilgrimage because it was closer to me than the Blue Ridge and also because its setting as a lonely peak in the midst of the rolling western Piedmont seemed too alluring to pass up.

MASLOWSKI WILDLIFE PRODUCTIONS

Ravens depend on meat to survive but will forage for fruit and nuts when necessary.

Pilot Mountain has been used as a way and guidepost for hunters and trade thousands of years; I hoped to use it means of revisiting an old friend and, I tasting again that soaring sense of em I'd felt during previous contact.

What mere bird could afford such solation? The common or Northern (*Corvus corax*) is the most widespre all corvid (crowlike) birds, a circum species native to northern and weste North America, the Mediterranean b northern Europe and much of Asia. R have a wingspan of over 4 feet, a leng around 27 inches from bill to tail tip a weight of over 2 ½ pounds, four tim heavy as their taxonomic allies the c Cloaked in ebony feathers that direct light can roil into marbled arabesqu metallic greens and purples, the spec possessed of a powerful bill up to 3 ¼ long with a slight hook at the end of upper mandible to facilitate the teari meat. The birds are heavily bearded with bristling whiskers and throat feathers can be ruffed out to touch the ground a of excited communication or in court

Though ravens superficially rese common crows (*Corvus brachyrhinc* their greater size and distinct vocaliz denote another animal altogether. The complex social structure is dependen intricate vocalizations that, like our vary from place to place in distinct di or accents. Ravens are believed to have diversity of vocal patterns than any animal except humans, with calls an ranging from a foreboding awk to th

of rushing water to knocking, trilling, ig and bubbling sounds. Ravens are nt mimics as well, having been docu- l as replicating gunfire, automobile s, chain saws, church bells and even speech as faithfully as a macaw.

raven's remarkable powers of flight ede those of crows and indeed any ongbird. Ravens can twist and turn air like the nimblest of raptors, dive tounding speed, fly upside down for erable distances, and even soar on utstretched wings like hawks and And as complex and successful as is ial system of the common crow, raven is even more intricate, cohesive and hing. When walking in raven country, in the presence of an intelligent and rising tribe of beings with a language, hierarchy and network of personal nships that mirror our own.

rived at Pilot Mountain a little before found a suitably distant campsite, d on boots and canteen and headed for nnacle, that isolated knob of quartzite almost 2,500 feet high that rose unbidden from the ancient landscape climbing westward toward the Blue Ridge foothills. This isolate and irregular geological feature, remnant of the primordial Sauratown Mountains, provided the proper elevation and climate to support flora and fauna otherwise not encountered until high in the Mountains. The mountain's microclimate, a tiny piece of a much larger puzzle separated by miles of lowland farms and freeways, must be a challenging habitat for those more northern species that eke out a living on this miniature sky island far from their Appalachian kin. To make it here, animals must be supremely adapted to their environment and able to take whatever nourishment comes their way. Consistently successful foraging is crucial to a bird whose range covers mountains, deserts and everything in between. They prey on the eggs and young of other birds, rodents, grains, worms, insects, fresh carrion, and our plentiful human garbage. Though generally solitary foragers, ravens sometimes hunt larger game cooperatively.

Both sexes construct a ponderous nest of freshly broken limbs, usually on naked stone slopes or high up an evergreen tree. The four to five young, hatched in the early spring, are devotedly attended to by both parents. Even suburbanized crows nest away from the racket of human society, but wilderness-loving ravens prefer even more distance between themselves and mankind, nesting deep in mature forestland and along lonely cliff faces such as the scoured and broken battlements of the Big Pinnacle I was now admiring from below. Turkey vultures skimmed the treetops and circled the great knob's forested head, but no thick black crosses with pointed heads and tails darkened the spring sky. I kept walking upward.

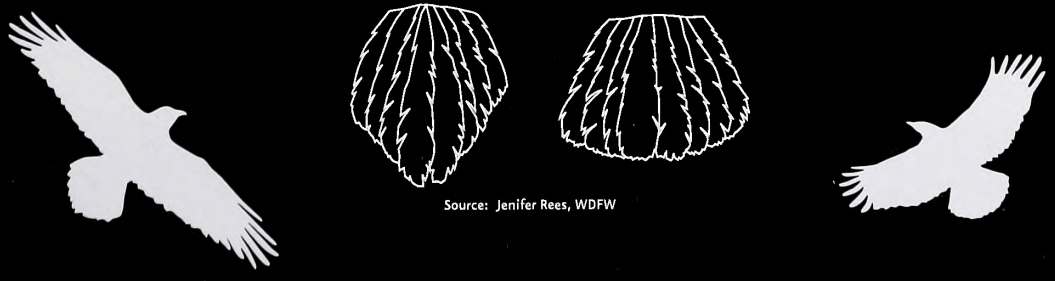
Ravens evolved in the great coniferous forests of the northern hemisphere's subarctic taiga, where food derived from trees and other plants is scarce during the brief summers and almost nonexistent during the long months of cold and darkness. Therefore, like polar bears, grizzlies, wolves, owls and hawks, as well as the humans who have made

RAVEN *vs.* CROW

RAYMOND BARLOW PHOTOGRAPHY

TODD PUSSER

Ravens and crows can be differentiated in flight by their size, beaks, wing characteristics and tail shape. Ravens have a wingspan of up to 4 feet, similar to a hawk. Their primary feathers (the finger-like protrusions on their wing tips) are longer and more defined than those of crows. Ravens' beaks are longer, thinner and more curved than crows' beaks. Finally, the tails of ravens come to a triangular point, while crows' tails round off like a sea shell.



Source: Jenifer Rees, WDFW

Like wolves and men,
ravens have developed a highly regarded social polity
in which cooperation and altruism yield results for the entire tribe.

GREG LASLEY/KAC PRODUCTIONS

arctic their home for millennia, ravens
l upon meat to survive. Like wolves
n, ravens have developed a highly
d social polity in which cooperation
ruism yield results for the entire tribe.
were the first birds documented as
inviting others of their kind to join
munal feasting when food is discov-
nd whether or not the behavior began
ensive means of providing "strength
bers" when approaching a potential
similar danger, ravens today routinely
for reinforcements before taking their
ck off a winter-killed deer, a bear's or
s leftovers or a humble garbage heap.
sun was growing hotter as the hours
, and I circled the switchbacks around
nnacle, stumbling over the plentiful
on the trail as my eyes roamed the
lanks for bushel basket-sized nests of
es and evergreen boughs. Dazzling
blossoms of rhododendron crowded
both sides, and I pushed through
y stands of trailside mountain laurel
eir dense bunches of fragrant white
. The thick, pregnant breeze of spring
suspirating *hissss* as it passed slowly
h the pines, bringing with it at last
rt-stopping sound I'd come to hear:
wk awk awk!
mediately froze and went into a crouch
hade of the laurels, scanning the skies
the pinnacle for movement. As usual
en's call was indistinct in its prox-
The bird sounded as though it could
er around the next corner or half a
vay. After waiting for more, I got up
lked on, encouraged by this evidence
least one raven remained here—
my eyes felt brighter and a strange
nent burned behind them, the accu-
d scales from weeks of urban tension
away as I trotted further up the incline
my hoped-for rendezvous.
th sent a white raven out to reconnoi-
he Flood began to recede; the raven,
ly following its own agenda, began

LARRY DITTO/KAC PRODUCTIONS

Crows are powerful fliers and talented mimics, replicating dozens of other sounds, including human speech.

feeding on a floating carcass instead, so Noah released a dove and God turned the raven black for not sticking to the script. For Europeans, accustomed over thousands of years to seeing these great black birds feasting upon the sprawling remains of the continent's countless battlefields, the raven naturally became associated with portents of doom. Creator, trickster, harbinger of death, the raven's image has darkened the minds of seers and sages since the Stone Age. For me, after years of silent enjoyment and wonder, the raven has come to represent wisdom, liberty, prophesy and . . . humor. Few other species seem to have so much fun with themselves and others. I've seen ravens chasing red-tailed hawks for the sheer wide-eyed hell of it, pulling their rusty tail feathers before peeling away in another direction as the hawks, with a somewhat different outlook on comedy, tear off in pursuit of their coal-black tormenters.

But the greatest testament to the raven's social and acrobatic skills, something I'd witnessed only once before at the time, lay in wait for me as I rounded the next stony shoulder of the trail. Wiping the sweat from my eyes, I glanced up in time to see two ravens out over the woodlands below me, almost at eye level as they tranquilly circled one another in widening gyres, gradually ascending in the afternoon sun until they were nearly invisible to the unaided eye. I kept my 8x32s on the pair, evidently conducting a mating ritual though they had most likely already nested, as they floated the thermal updraft to its peak, then lazily went their separate ways for a time as they lost altitude before slicing rapidly back toward each other without a wingbeat. Meeting its partner again, one bird flipped over and locked claws with its mate, and they fell, one over the other, back to earth, a ragged ebony wheel of bone, nerve and feathers shining blackly in the fading sunlight.

As the couple fell down, down, down, my breath stopped, my heart stopped. At the nadir of their fall, about 50 feet from the treetops, the ravens broke apart, and each soared upward as one great arm uplifted to Heaven, there to reunite and paddle around the pinnacle to their perch. I felt then like I was the one man on Earth to be privileged with this gift.

Late that night, still in the glow of the moment, brooding over my campfire I saw things from a more enlightened perspective. The endless troubles of life in our era are an inescapable burden, and mine are no greater than anyone else's. The existential despair that had haunted my last several months, that sense of a path not taken and a dream unfulfilled, would be waiting for me back in Raleigh. But now I had a new courage to see my way through, to make the unpleasant choices that come with the pursuit of happiness. An unlikely ally had come to my aid, unasked and uncompensated.

The sun went down in flames as a storm crept in from the southwest. Again I wondered what the world will be like when all of the mundane, urgent problems of life are finally over, and a new, older world is left standing in our stead. In the last light I hear the thunder rolling, the first patter of raindrops on new leaves, and from somewhere above a final comment on the wonder, terror and beauty of it all.

Awk! Awk awk awk! ◆

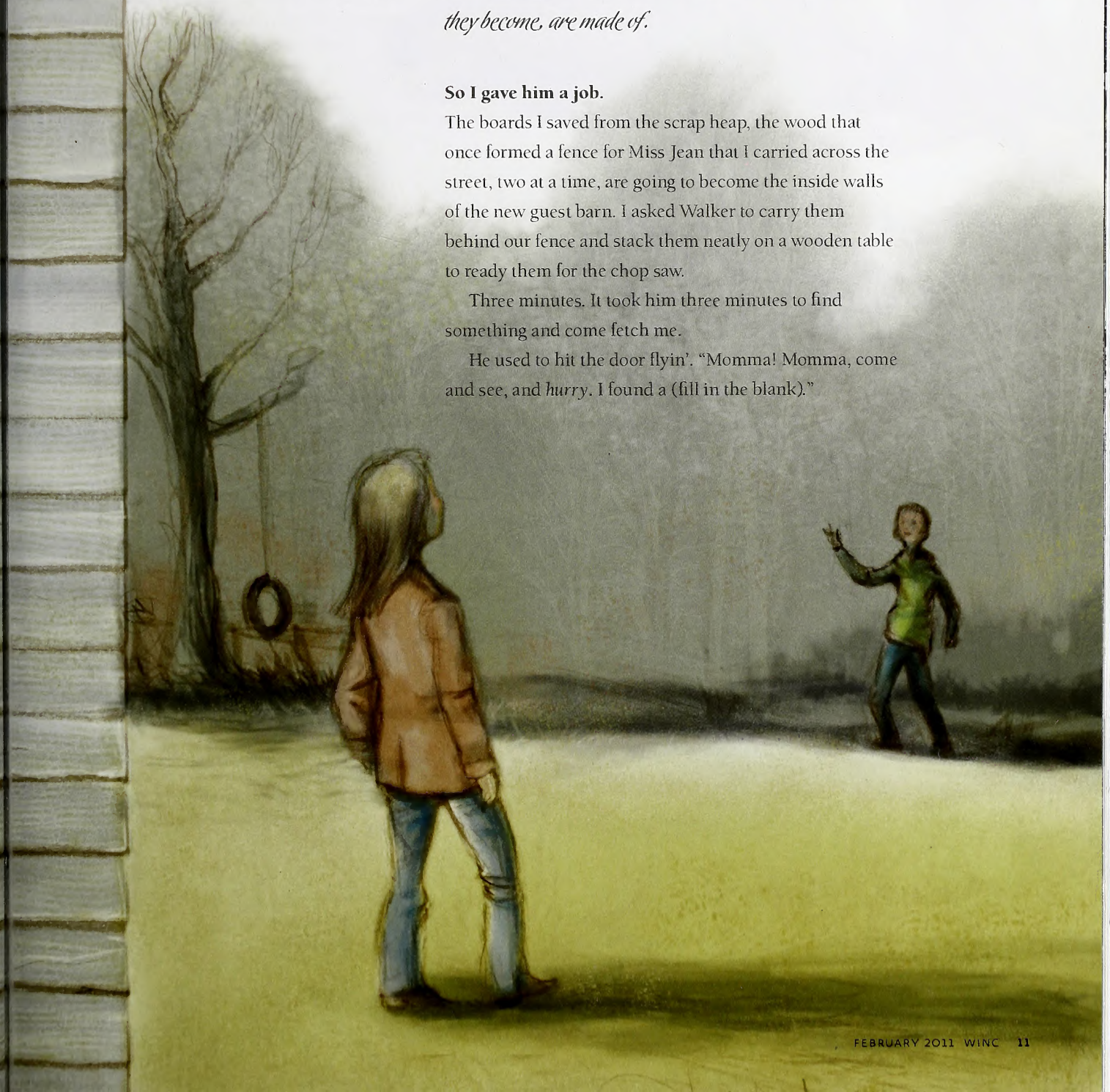
William H. Funk is an attorney, freelance writer and aspiring filmmaker living in Virginia's Shenandoah Valley. He can be reached at williamfunk3@verizon.net.

written by *Shari Smith*

illustrated by *Karen Lee*

Still Walker

What are little boys made of? Spiders and frogs and lightning bugs, that's what little boys, and the grownups they become, are made of.



So I gave him a job.

The boards I saved from the scrap heap, the wood that once formed a fence for Miss Jean that I carried across the street, two at a time, are going to become the inside walls of the new guest barn. I asked Walker to carry them behind our fence and stack them neatly on a wooden table to ready them for the chop saw.

Three minutes. It took him three minutes to find something and come fetch me.

He used to hit the door flyin'. "Momma! Momma, come and see, and *hurry*. I found a (fill in the blank)."

His room has always held the poorly kept secrets of boy rocks, each with more magic than the last; shells, of tu and of the beach; lightning bugs in Mason jars; a pr mantis in a shoebox and all the reference books he nee irritate the hell out of lesser-informed guests with his knowledge of all creatures great and small.

I was summoned for a garden spider when he was almost four. He named her Cha and had a bagel every morning as he watched her make her kill. We looked up everythi could find about the black-and-yellow *Argiope*, and when she laid an egg sack and be half her size, I lied to the boy and did not tell him that she was dead and the daddy had her place. I lied to him again the next year when he found another one and believed Charlotte come back because he had cared for her so gently by building a shelter arou web when the winds of a faraway hurricane threatened those babies he waited on.

I lied to him four more times, four more falls until he looked it up in the "National Aud Society Field Guide to North American Insects and Spiders" and learned the truth. He mad at me. He was mad at the book.

My presence has been commanded for box turtles that really aren't turtles and snak and walking sticks. I've been called to save half-dead baby birds and witness the incre size of a woodpecker hole in the 20 minutes since the last time he insisted I "come quick was once subjected to the sight of my boy tenderly cradling a nest of baby moles, desp world-famous, mind-numbing, bone-crushing fear of rodents, because he reasoned "t aren't mice" as I scrubbed his little hands with Brillo pads and Clorox.

His room has always held the poorly kept secrets of boyhood: rocks, each with more than the last; shells, of turtles and of the beach; lightning bugs in Mason jars; a praying m in a shoebox and all the reference books he needed to irritate the hell out of lesser-inf guests with his vast knowledge of all creatures great and small.

Today, at soon-to-be-16, he has come in the house seven times during what should been a 30-minute task. He found the perfect shell of a cicada and thought I should se the state in which he found it in case it tore when he tried to pick it up. It didn't. It no on a stack of books, the Shiloh trilogy, behind the glass door of a cabinet that first be in a woman's kitchen in 1931. I have some doubts about her willingness to immort cicada where her fine china used to be, but who I am to say?

A katydid, a dead hornet "with all the fuzz still attached," an impressive worm hole wood, an impressive worm, a click beetle and what he is sure is the hole of a blacksnak all propelled him from his assigned task and through the front door yelling, "Hey Mom murder me, but you gotta see this."

to him still. I pretend he is driving me nuts, that I don't want to be taken from my this computer and called to witness the latest in his fascinations. I roll my eyes and hs a little and I walk behind him so that he doesn't see his momma tearing up as she ers how little and blond and happy he was from the moment he was born. I say, "Yes, it is truly a remarkable (fill in the blank), and now that I have been treated to this wonature, can I return, you know, to paying the bills?"

nder how long it will be until I am not his first call, by cell phone or ear-piecing holler. days when his language was his own and he came running into the kitchen, insisting oking could wait, that I needed to watch a primate program on the Discovery Channel. hole hour, Momma, a whole hour just on Pin-ehan-gees." I had to look to his big sister slation. He was so proud of his knowledge of White House history when, at 4, he told the 16th President of the United States was "Hammerhead Lincoln" that I threatened s of his teachers if he learned otherwise. For the remainder of Walker's preschool year, hers referred to Honest Abe as "Hammerhead" and I am not sorry for it.

sweet child is in there, that boy who slept with stuffed animals he named for the great- Carolina: Mitchell the bear, Chimney Rock the mountain lion, River C. the owl and ver named Grandfather. His television is permanently tuned into Sports Center, and ts hoops more than he fishes, but he is there.

v him today. ◆

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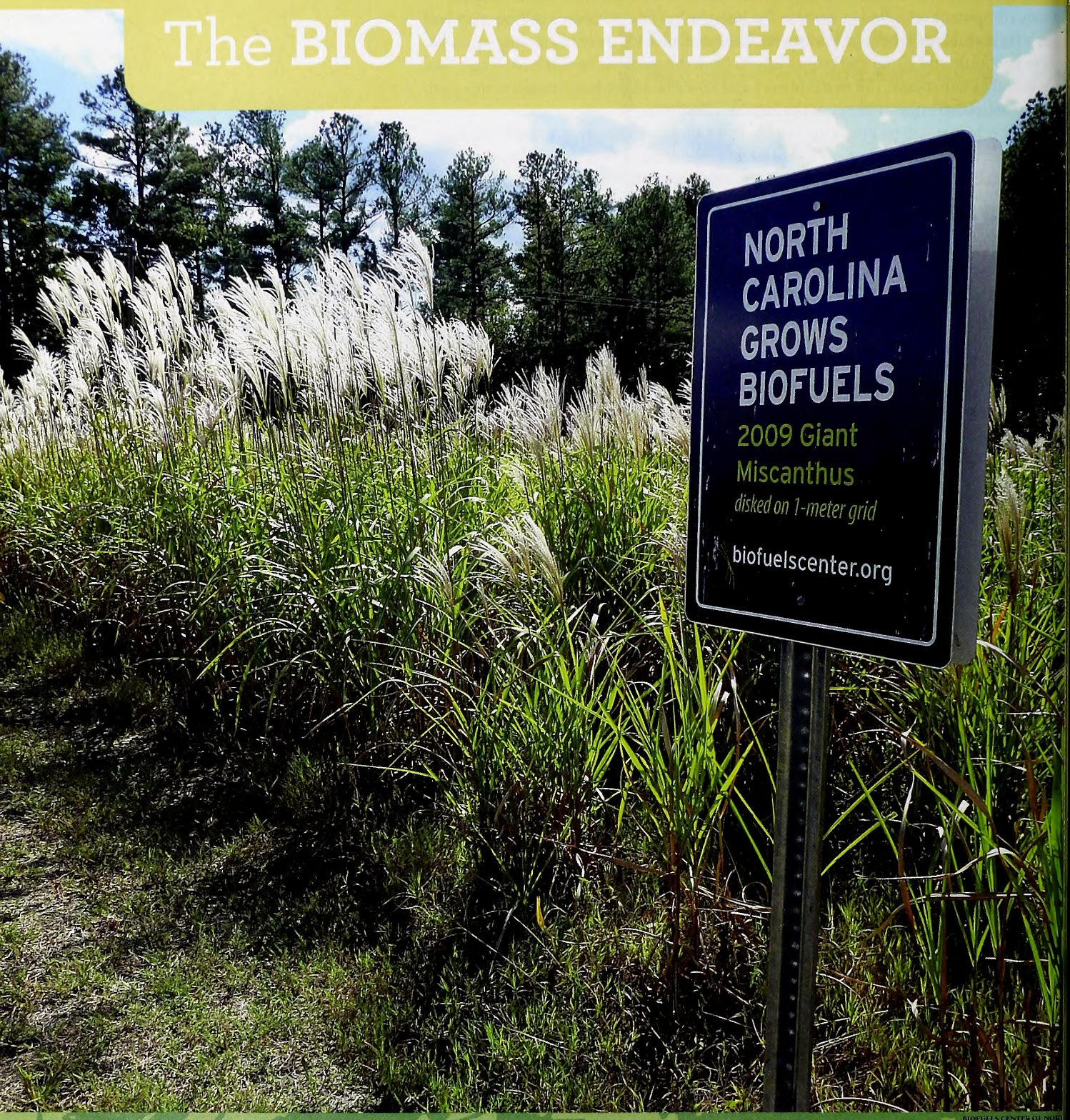
mith is a frequent contributor to Wildlife in North Carolina *and is at work on a non- book about her town of Claremont.*

I roll my eyes and he laughs a little and I walk behind im so that he doesn't see his momma tearing up as she remembers how little and blond and happy he was from he moment he was born.

The BIOMASS ENDEAVOR



BIOFUELS CENTER OF NORT

North Carolina's energy future might be found in its forests and on its farms. WRITTEN BY Steve Wall

NORTH CAROLINA ASSOCIATION OF PROFESSIONAL LOGGERS

WEYERHAEUSER

North Carolina is engaged in two significant initiatives that have the potential to transform how the state's energy needs for both electricity and transportation are met. One of the initiatives establishes new mandates for the generation of renewable electricity, and the other sets new goals for the production of liquid biofuels. Both of these initiatives will require substantial amounts of biomass.

Previous page: Biomass can include both grasses and debris from clear-cuts. Properly managed, efforts can benefit forest-dependent species such as the Southern toad, deer mouse (below) and tiger salamander (opposite page). Mechanical removal of woody debris in longleaf stands can help accomplish the same goals as prescribed fire (below).

NATHANIEL OSBORNE

TODD PUSSER

MASLOWSKI WILDLIFE PRODUCTIONS

Biomass is a catchall term that includes a wide range of sources, such as energy grasses, agricultural crop residues, forest resources and wood waste from construction and manufacturing. One of these categories, woody biomass, typically refers to small trees, tops and limbs and other forest residues. The use of woody biomass will be a significant component of North Carolina's new energy economy, and therefore the state initiatives will rely heavily on the state's farms and forestlands.

Although the future of this new energy economy is promising, questions about its impacts on North Carolina forests, farms and wildlife habitat are already being raised. Addressing these questions in a deliberative manner is a necessity. This necessity arises from two equal imperatives: our state's new quest for homegrown energy sources, and our state's longstanding commitment to protecting our natural resources.

A Regional Leader in Renewable Energy

North Carolina imports most of its energy needs in the form of petroleum, coal and natural gas. As a result, $17 billion a year is being spent out of state for energy purposes. In 2007, state leaders set out to reduce the amount of money leaving the state for energy purchases and to make North Carolina more energy independent. North Carolina became the first state in the Southeast to pass a law mandating that a certain percentage of electricity produced in-state be generated from renewable resources. The law had several goals, including energy independence, stimulating economic investment and reducing greenhouse gas emissions. At the heart of this complex law is a long-term requirement that by the year 2021, 12.5 percent of the state's electricity generation must be met through renewable energy and energy efficiency measures.

Under the law, power companies have flexibility to choose the type of renewable energy resources (such as solar, wind and biomass) they can use to meet the mandate. However, when the legislation was being developed and debated at the General Assembly, many involved believed that the combustion of woody biomass would constitute the bulk of new renewable energy generation. Within the last year, filings with the N.C. Utilities Commission from Duke Energy and Progress Energy affirm the significant role woody biomass will likely have in North Carolina's renewable energy future.

At the same time that legislators pa law to diversify sources of electricity g tion, the state was also developing a g grow the renewable transportation fue tor. In 2007, North Carolina's Strategic for Biofuels Leadership established a go by 2017, 10 percent of the liquid fuels in Carolina will come from biofuels grow produced within the state. The Gene Assembly showed a strong commitme this goal with the establishment of the B Center of North Carolina, which is loc the Granville County town of Oxford.

Landscape-Changing Initiatives

The earlier public concerns and policy c —such as "food versus fuel"—that ch terized the national biomass energy di sions in previous years are unlikely to the same concerns relative to North Ca efforts to develop biopower and biof Given current land conditions and agri al practices, the state is unlikely to see version from land producing food cr land producing fuel crops.

Instead, the discussion in North Ca will likely focus on how the developm biomass energy markets will affect the forestlands. There is little doubt that h the state energy initiatives, renewable and biofuels, will require significant u forest resources in years to come. The on the state's almost 18 million acres forestlands could be significant.

Some may see an economic boon fo owners in the development of new ma for forestry, but others see potential h using the state's forests for energy prod A 2010 report from the North Carolin Environmental Management Comm (EMC), an agency charged with pro the state's air and water resources, fo on the possible impacts to the state's resources from energy markets. The found that "the use of woody biomass energy production has a broad range of tial impacts that, without adequate safe could be harmful for the environment, u health and culture of the State."

The report from the EMC raises co about adverse impacts to wildlife habit biodiversity, as well as conversion of forests to plantations. Though the EMC was limited in scope to potential imp North Carolina, many organizations agencies nationwide are undertaking evaluations. For example, in March

rt from the National Wildlife Fed-
n, an advocacy organization based
shington, D.C., echoed many of the
natural resource concerns identified
EMC.

ever-growing number of reports out-
concerns and calling for guidelines and
ions governing biomass utilization for
encapsulate one viewpoint. Another
osits that increased utilization of our
and farms for energy will lead to greater
of the state's natural resources over
roponents of this latter view subscribe
theory that energy generated from
biomass has an appropriate place in
te's mix for both electricity and trans-
on. Dan Richter, professor of soils and
ecology at Duke University, believes
e EMC report casts woody biomass as
nd-class citizen in relation to other
able resources such as solar and wind.
r has written that "if properly sited and
to sustainably managed woodsheds,
ss energy facilities offer a host of very
e and recurring economic, societal and
nmental benefits."

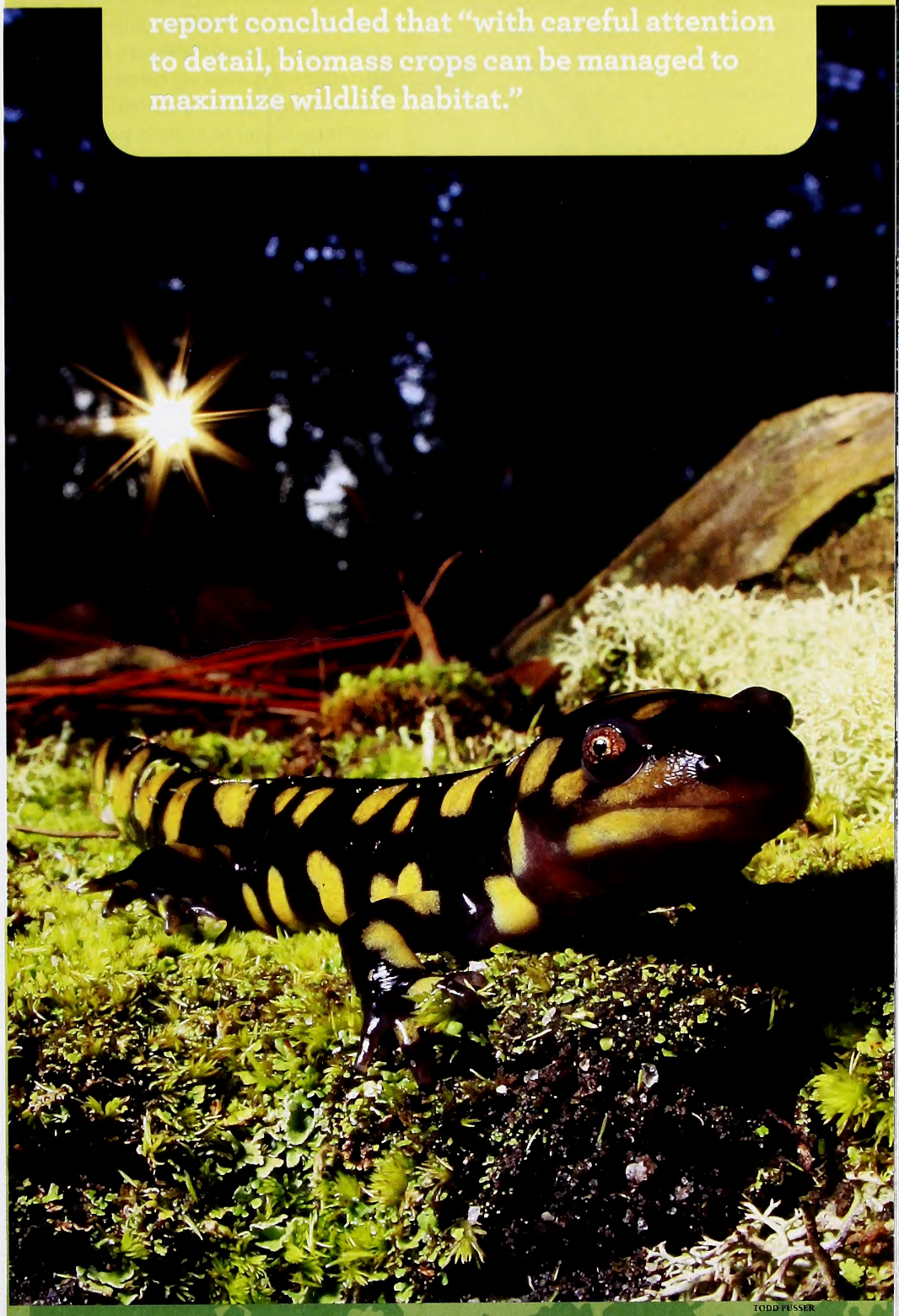
pporters of this vantage point also
e potential new demand for forest
ces and energy crops as a way to create
urces of income that will allow farmers
her landowners to remain on the land.
.C. Department of Agriculture and
mer Services reports that since 2002
te has lost more than 600,000 acres of
nd. As the state's population continues
v, this trend toward conversion of farm-
restland to urban development is likely
tinue. To farmers and landowners, the
mic benefits of a new revenue source are
ne and may lead to increased farm- and
and retention.

al Gain for Energy and Wildlife

singly, the use of forest resources for
ss power and biofuels is seen as having
tential for mutual gain in creating
and for creating tangible benefits to
l resources, including wildlife habitat.
quently, the debate about using forests
rms to procure woody biomass for ener-
oving from one in which environmen-
erests and industry interests reflexively
out opposite ends of the spectrum to
searching for common ground on how
proceed.

spite the potential adverse impacts it
fied, the National Wildlife Federation

Despite the potential adverse impacts it identified, the National Wildlife Federation report concluded that "with careful attention to detail, biomass crops can be managed to maximize wildlife habitat."



TODD PUSSER

LEARN MORE

North Carolina's Renewable Energy Law: Senate Bill 3, Session Law 2007-397

http://www.ncleg.net/Sessions/2007/Bills/Senate/PDF/S3v6.pdf

North Carolina's Strategic Plan for Biofuels Leadership

http://www.biofuelscenter.org/userfiles/File/NC_Strategic_Plan_for_Biofuels_Leadership.pdf

North Carolina Environmental Management Commission Biomass Report, March 2010

http://www.ncleg.net/documentsites/committees/LCGCC/Meeting%20Documents/2009-2010%20Interim/March%2015,%202010/Handouts%20and%20Presentations/2010-0315%20EMC%20Biomass%20Report%20%20Draft.pdf

National Wildlife Federation Report: "Growing a Green Energy Future," March 2010

http://www.nwf.org/News-and Magazines/Media-Center/ Reports/Archive/2010/~/media/PDFs/Global%20Warming/Reports/Growing-a-green-energy-future.ashx

North Carolina Agricultural Development and Farmland Preservation Trust Fund, 2009 Annual Report

http://www.ncadfp.org/documents/CycleIIIADFPAnnualReport.pdf

N.C. State University Forestry Extension Biomass Harvesting Guide

http://www.ces.ncsu.edu/forestry/biomass/pubs/WB005.pdf

Massachusetts Department of Energy Resources Biomass Report, June 2010:

http://www.mass.gov/Eoeea/docs/doer/renewables/biomass/Manomet_Biomass_Report_Full_LoRez.pdf

report concluded that "with careful attention to detail, biomass crops can be managed to maximize wildlife habitat." Julie Sibbing, one of the co-authors of the report, believes that the impact of harvesting biomass on wildlife habitat can run the full spectrum from "a totally negative outcome to a totally positive outcome," depending on the methods and practices implemented during a biomass harvest.

A revealing aspect of the National Wildlife Federation report is its premise that biomass energy and forest enhancement can go hand in hand. One example cited in the report notes that the harvesting of woody biomass for energy can complement North Carolina's ongoing efforts to restore the longleaf pine ecosystem throughout the Sandhills. Mechanical removal of woody biomass from longleaf stands where the understory is too thick for prescribed fire is just one example of this potential win-win situation. The connection between restoring longleaf pine and producing energy from our forests nicely symbolizes evolutionary changes in our state's silviculture sector.

The process of educating landowners on factors to consider during a biomass harvest is of growing importance. Efforts to meet this educational need are already under way. A biomass harvesting guide prepared and distributed by Forestry Extension staff at N.C. State University advises landowners and foresters conducting woody biomass harvests to retain critical wildlife habitat elements such as downed woody debris and to avoid or limit disruption of wildlife during breeding and nesting seasons.

Studies are also under way that will give policymakers a clearer picture of the impacts of biomass energy on our states' lands. Researchers from N.C. State University and the University of Georgia are working on a multiyear study to evaluate the impacts on wildlife from the harvesting of woody biomass. Some of the wildlife species that will be evaluated under the study include snakes, frogs, salamanders, mice and cotton rats. The research is being conducted on priva owned forestlands, including sites own Weyerhaeuser, Plum Creek Timber a Georgia Pacific. "We have a great deal o on the responses of wildlife to timber vesting," said Bob Emory, Weyerhaeu Southern Timberlands Environmental manager. "People wonder whether a ch in harvest techniques to recover more bi will change the effects of our forest ma ment on wildlife. This study will help answer that question."

Dennis Hazel, an extension speciali associate professor in the Departmen Forestry and Environmental Resourc N.C. State, is one of the lead researcher the study. Hazel believes that the study resents a significant collaboration bet the private forestry industry and nonp conservation groups, both of which ha input into helping shape the study and of which have a vested interest in ens stewardship over the lands as the bio energy sector grows.

Uncertain Future

Despite the potential of mutual gain f in-state energy sources and for enhance to forests and wildlife habitat, questio remain about the long-term consequen using farms and forests for energy. Pu sentiment about the use of woody bio for energy is mixed. A 2010 poll condu by Elon University about North Caroli attitudes on environmental issues foun a majority of those surveyed oppose us forest resources to produce energy fuels a divide in the public discourse over th of forest resources accentuates the nee policies that will provide assurances t zens and communities that state oversi biomass energy facilities is being exerc

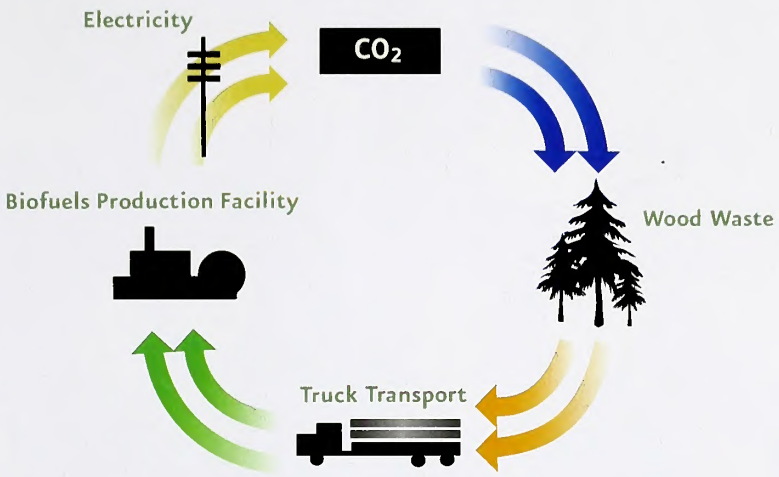
North Carolina became a leader i Southeast with its strong commitmen renewable energy and biofuels. As evid by the ongoing studies and increasing tion from state officials, actions are now

Despite the potential of mutual gain for in-state energy sources and for enhancements to forests and wildlife habitat, questions still remain about the long-term consequences of using farms and forests for energy.

ensure that North Carolina is also a
er in addressing the complex scenario of
production from forest- and farmlands
suring environmental sustainability of
me lands. This difficult balancing act
ght with hazards and has stalled the
of the bioenergy market in other states.
es around the country are wrestling
e challenging issues related to the use
ass for energy. Massachusetts had been
ively pursuing biomass power as a key
nent of its renewable energy plan.
er, following the release of a report
into question the greenhouse gas
s of biomass power, Massachusetts
s made an abrupt about-face regarding
s policy. Proposed biopower facilities
da and Michigan have faced stiff oppo-
causing cancellation of the projects.
n these ongoing concerns, some states
veloped voluntary biomass harvesting
nes, and a few others have gone a step
and adopted sustainability require-
related to biomass harvesting. These
ments would mandate water, soil and
e protection. North Carolina leaders
king at these models from around the
y and striving to ensure that these com-
d issues are addressed up front with
g-term vision of growing the biomass
markets without any deleterious
s on our state's landscape.
development of both the biomass
and biofuels industries is at the center
h Carolina's emerging green economy.
htful deliberation with an eye toward
nge policies that foster the growth of
ndustries in a sustainable manner is
l in the years to come. It is quite likely
e development of these policies will
tely decide the fate of North Carolina's
ss endeavor.

*Vall is director of policy and environ-
issues for the Biofuels Center of North
na and a former member of the N.C.
Policy Council.*

ENERGY PRODUCTION FROM BIOMASS: A SUSTAINABLE CYCLE



NATHANIEL OSBORNE

NATHANIEL OSBORNE

TODD PUSSER

NATHANIEL OSBORNE

Harvested forests regenerate relatively quickly into early successional habitat favorable to animals such as the scarlet kingsnake. Woody debris is chipped onsite and transported to a facility where it is used for energy generation or fuel production.

The Mating Dance of the SPOTTED SALAMANDER

Neither cold nor wet nor dark of night can keep this amateur herpetologist from his appointed rounds.

Sometimes I like to lounge at home on a Saturday or Sunday afternoon in the late fall or winter and sit in on a football game my wife and son are watching. They're the sports fans at my house. I'll even admit to selecting a game at times when I'm home alone and have the opportunity to engage in that exclusive behavior of male humans—channel jumping with the remote. I don't really like watching sports that much. There's just something cozy and comforting about sitting inside on a cold day with a good roof overhead and a functioning furnace and watching thousands of fans clothed in parkas, mittens and woolen scarves cheering on two teams of players in brightly contrasting colored uniforms battling it out over a small leather ball despite mud, ice, sleet or whatever other inclement weather conditions are doled out to them that particular day.

It doesn't really matter a whole lot to me who's winning, or which teams are playing for that matter, although I usually choose one color to root for if I watch long enough. The only reason I mention this at all is that I think there's a lot of similarity between the strength of motivation of those wet and freezing fans and players and of myself a little later in the winter . . . say about the middle of February, about 10 at night until 2 in the morning, the first warm rainy night at the end of the winter, searching for the elusive mating dance of the spotted salamander.

Now, I don't know if this dance will have a perpetual attraction for me, although I've been tracking it fervently for the past four years. I know my motives are somewhat scientific, somewhat poetic. Or maybe it's the blending of the two purposes that would be more accurate. From the depths of the earth, it seems, the right temperature, the right season, the dark of the night, rainfall and probably a score of other variables converge to bring hundreds of these beautifully sculpted, dark-eyed, yellow-and-orange-spotted amphibians from their far-flung fossorial haunts. And I have aspired to tune in to these calls to assemble, myself.

The habitat that becomes the focus of my mid-February night excursions is on the property of a good friend of mine in Chatham County, about a 40-minute drive from my home in Durham. Without his help and our wives' patience I would never have been privy to the salamanders' yearly mating migrations, because, as you will see, it took a number of variables of my own over several years' time for me to reach synchronicity with the dark amphibians and their annual celebration.

written by Bob Palmatier
photographed by Todd Pusser

My friend Mac brought the first spotted salamander I ever saw to my classroom in late February of 1990. I had been learning that year how to care for marbled salamanders in captivity. The previous fall I had driven five of my fifth-grade students to my first fall meeting of the N.C. Herpetological Society in Raleigh, and I had gotten some pointers on salamander husbandry over the phone from Wayne Van Devender, of Appalachian State University.

The marbleds I had collected from a fellow teacher's yard in November. Their exquisite coloring, the immaculate surfaces of their skin when you find them in the wild, everything about these creatures fascinated me. I still can't comprehend how they keep their moist skins so free of dirt or any kind of soiling in habitat. Wherever I have worked, in whatever capacity, from ditchdigger to schoolteacher, I am invariably the filthiest of my kind present at the end of the day. So the whole mole salamander family has my undivided admiration for this quality alone.

And you can imagine my amazement over the larger female spotted my friend brought me after I grew to appreciate the marbleds. Mac had heard about my recent affliction with herpatitis and had gotten in the habit of bringing me reptiles and amphibians he encountered on his own ramblings in the woods and over the highways of Chatham County. So that very weekend I went to visit him and see for myself the knee-deep spring-fed hollow where he said he'd found her swimming. My excitement was intense. Where there was one, there would be others—right?

Wrong. The spring that feeds the salamander's hollow spills out and fills several ruts on an ancient logging road next to it before it trickles down the wooded, rocky hillside below. This was to be ground zero for future operations. We examined the 10 to 15 large, translucent egg masses in the vernal rut-pools, as subsequent spring and summer examinations would prove them to be. He showed me how he had observed red-spotted newts under some of them, evidently feeding off the masses. Other salamander larvae darted cautiously through the ruts when disturbed. These would prove later to h marbled larvae. We combed the hillsi above his spotted salamander's hollow found more marbled larvae wherever rainfall provided vernal water passage But no more spotteds.

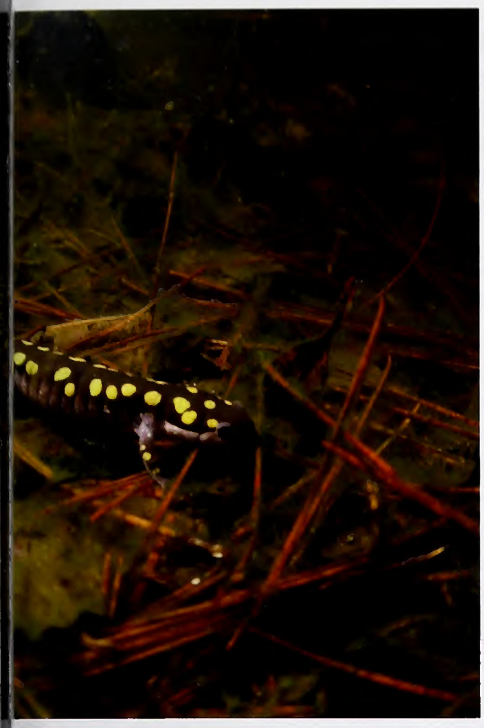
At someone's house later that year I across an article in the April–May 1990 of *National Wildlife* magazine that told spotted salamander story in more det These were not individual solitary mat like the marbled salamanders' trysts November. These were mass affairs, inv hundreds or more in some locations. I talked our school librarian out of the sc copy and pored over it the following su and fall. "The first warm rain at the end winter" … now, how do you figure tha

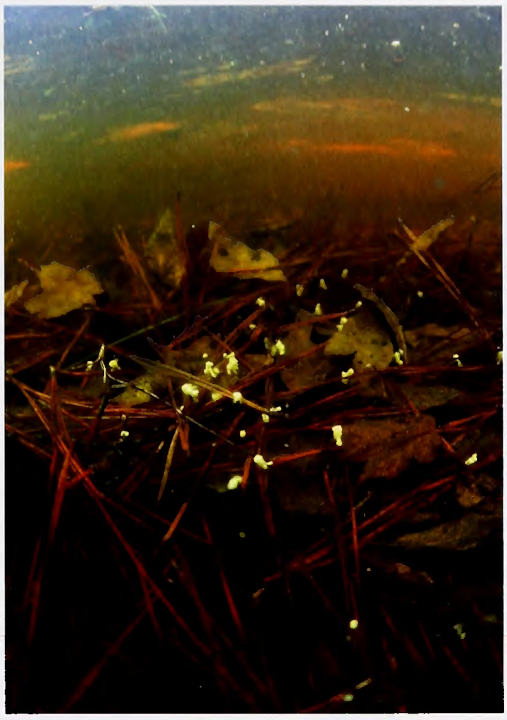
I scoured the hillside above Mac's h on crisp, sunny days the next winter. hilly land with prolific rock outcropp was a pleasure in itself. These were the days of my herping, and I was learning would become one of the first axioms pastime for me: Learn to appreciate you find if you're not finding what yo specifically looking for.

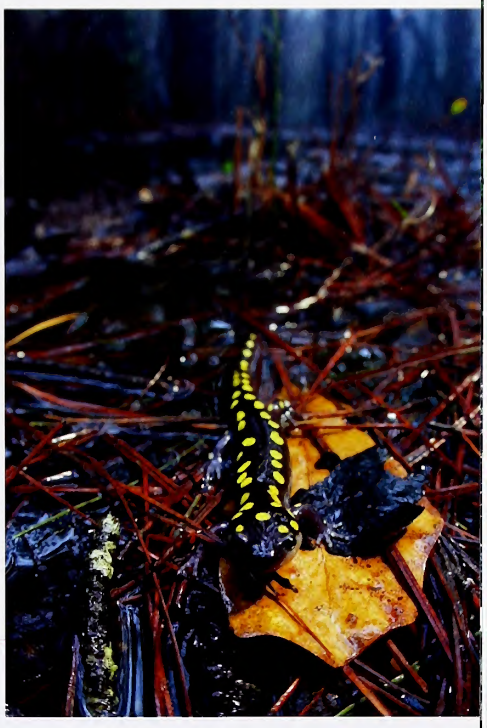
I tracked through thorn and tangl brambles to follow a spring upstream its salamander hollow and came upon tiful thick growths of shining and co glistening green sphagnum moss, and lost the spring underground. But my re noitering would bear fruit later. As we the middle of February, I began to find egg masses in some of the secluded m pools of the spring above the main hol So, then, it wasn't just one night, but dently a somewhat brief period of da weeks in which the variables would co closer and closer to synchronization. else could the hundreds, or thousands spotted salamanders gather themselv faithfully, each from its yearlong hab area, to the great mass convocation?

Now I started to watch the weather casts closely, the night temperatures a as rain predictions. If it started rainin the evening with a reasonably "warm" perature for mid-February, I felt confi we would meet our revelers. I could ca he could walk the 50 yards up into the above his house to check for our guest then signal me to drive over to Chath County. Simple. Right?

Wrong! What followed was a two- period of diplomacy and negotiation







Male spotted salamanders deposit their spermatophores (center) on the bottom of pools where they are picked up by the somewhat larger females.

lelicate nature. To give them full credit, ives involved had not been fully briefed ese midweek midnight excursions. I een obsessively *thinking* salamander, ig salamander, *breathing* salamander. usually game for whatever the adven- ight be, but the forgotten element een the wives. Beside every vaunted narried) herpetologist, male or female, nas to be either a very interested or a olerant mate. This wisdom was not at vident to me. But I have learned.

e first year I got Mac's phone message 30 a.m.: "They're all over the place!" I ble to visit the site the next afternoon work and select a couple of specimens vself and for the Museum of Life and e from the 10 salamanders Mac had ed. The rest I released back into the g pools. Mac didn't feel like joining at afternoon. He was flat on his back he flu. The spotted flu, I believe.

e second year I negotiated for myself a ght-only, limited-duration, on-site visit round 10 p.m. until 11 p.m. However, n, after starting up promisingly about , cleared off later and drew only about 20 salamanders. It was a clear, chilly, ooned night, and I was able to witness nally what Mac had described for me ar before, a strange behavior of the sal- lers in the deeper pool, which was 4 feet in diameter but hip to waist deep. trained our flashlights on the deep we could see, spinning up to the surface for a gulp of air and then executing a flip turn back down like a swimmer's racing turn, very proficient spotted salamander divers. I know these amphibians are not primarily aquatic, but these repeated, graceful surfacings were quite a surprise to me. What was going on down at the floor of the pool was not clearly visible to us.

The third year (February 1993) witnessed a new, expanded, more proficient and well-oiled operation. I was cleared to spend the night if necessary, it was raining blue blazes, and Mac and I had reconnoitered in the weeks before two additional possible sites, both connected to the original site by the same logging road. The three sites lay roughly in a straight line, each separated from the other by about a third of a mile. The second site was no more than a wide, leaf-filled puddle in the road, but it contained both marbled salamander larvae and newts, which was a good sign. The site farthest from Mac's house was a broad but shallow spring-fed pond right at the edge of a fairly precipitous drop-off in elevation. In the crisp daylight during the week before our night expedition, this pool, approximately 10 feet in diameter, already held 12 or more spotted egg masses and was clearly the most picturesque of the three locations.

During February breeding, a single spotted salamander egg mass (top) might be fertilized by many males or only one or two.

The precipitous hill below the pond fed spring water down more than 40 feet through a series of miniature rock- and sand-ledged basins and channels, shaded by lush ferns and an overstory of hardwoods.

Finally the long-awaited night arrived. As I pulled into Mac's steep driveway and adorned myself in poncho and rubber boots, dip nets and buckets, I decided to leave my camera behind. My photos from the year before had been of negligible value, and we had a lot of ground to cover. The rain was plentiful and promised to persist. Rivulets worked down the woods as we followed the path up toward the logging road, and it did not take me too long to make a mental note that hip boots would do wonders in the future to keep my jeans dry next time.

We met one suitor on his way down the logging road toward the rain-swollen vernal ruts. The deep pool was seething with yellow-spotted black divers like the rolling of a pot on the stove. The ruts likewise were filled with egg masses, and the water was muddied with the movements of salamanders who preferred this shallow-water venue. We scooped 10 salamanders into a bucket with our hands and small nets and determined to check out the second location. I would estimate that we saw at least 40 salamanders at the first mating pool.

I can't deny it. When I'm involved in one of these midnight outings, or halfway up a river birch in a busy shopping center parking lot collecting a Polyphemus cocoon, I find myself half suppressing a childish giggle, as if I'm getting away with something. Such curious behavior must be what draws me to watch those thousands of football fans I mentioned earlier in the rain and sleet and hail and chill cheering on their teams. Or maybe I just had a deprived childhood or have succeeded in finding a second one. In any case, here we were, walki quickly uphill on the logging road, bru ourselves by head-high pine saplings d ping with water. It was a good third of a to the next site we had earmarked, an o 6- or 7-foot puddle whose bottom, like rest of the trail, was covered with fallen l

We were not disappointed. And I b to wonder how many equally insignifi spots throughout the acres of undevelo land above us had drawn spotted assem that night. Here was a species I have n uncovered outside of mating time, pres in numbers at this small pool represent perhaps scores, or even hundreds, per throughout those woods that night. S the water was clearer because of the le in it, we could see the curiously unders nudging dance the articles I'd read had me to anticipate. There was no mounti amplexus, just a slow mingling or shuf as the 30 or so salamanders at this spot filled their annual mating instincts.

Here for the first time, too, I saw clea the tiny white-tipped, translucent and like spermatophores that the males wo leave casually on the leafy arena's unc water floor. This external fertilization least in that it requires no direct contac sexual parts of individuals) depends u the somewhat heftier females' selecting picking up the roughly conical male de with their cloacas. In this way the sub quent laying of an egg mass could eve tually be fertilized by up to 15 or 20 sui or only one or two, depending on the fer choices. I was later to witness more of a pattern to this activity.

Again we selected 10 salamanders bucket before we trudged on, leaving t second bucket, as we had the first, at t mating location. The third location wa farthest away from our starting point, a the most picturesque of the three. Sinc had already seen a large number of eg masses there the previous week, I real didn't know what to expect. I had sus pected, though never seen, that there w more breeding ponds throughout the a but what I had seen tonight had stagge even these suspicions. The picture I ha my mind was what only the moon or raining clouds are really ever witness scenes similar to what we had seen th night but multiplied immensely over t surface of this wooded hillside, and n doubt duplicated in number and intensi

eds of unseen locations across the
urface of the undeveloped areas of the
the county and beyond, that night.
logging road came to an abrupt halt
en continued perpendicularly to the
This meant that we were within 20
or so of our final target, the large but
v holding pond above the precipitous
-fed waterfalls. Neither our anticipa-
or our curiosity was disappointed here.
ashlight beams soon made out the
floor of this 10-foot-diameter pool
d with one great, slowly mingling
of the spotted amphibians. If my esti-
before were right, there lay before
east 80 to 100 salamanders. It was
vast ballroom crowded with calmly
ned dancers all dressed in their best
outfits.
e, trips to the surface were less hurried
ectacular. I was now more observant
white-tipped spermatophores beneath
ncers' feet. From what I had read, dis-
on of the spermatophores depended
males' nudging receptive females'
ith their rounded snouts. From the
er of spermatophores in evidence,
was no lack of positive pheromonal
ges present.
er, at home, I examined the activity of
ales and a female in a bucket I had
ed by covering it. The salamanders
till "in the mood," and I could get a
better look at the activity of each indi-
. What I noticed in these calmer and
quarters was that the males, whose
l areas were visibly quite swollen,
periodically flex their back knees
pear to "squeeze" the spermatophores
heir cloacas with their hind feet. As
s I noticed it, I could see this behavior
edly on the part of different males,
wo-footed squeeze resulting in the
t of one spermatophore on the bucket
t also seemed, although the limited
on the bucket bottom may have created
usion, that the males were engaging
mewhat deliberate effort to knock
heir competitors' spermatophores to
en the chances that their own might
ked up.
later returned the three sets of sala-
ers to their respective mating pools
the daylight hours and watched
aried reactions to their release. Most
n hid themselves beneath leaves or
the sheltering edges of their ponds,
probably to await more propitious times to travel, but I remember most vividly one individual at the third and largest pool. He very purposefully propelled himself across the water and, upon reaching shallower ground at its opposite side, began walking against the current up the pool's entrance stream. It was as if he was fed up with the whole affair and in a hurry to get home. Home must have been somewhere upstream, if one could judge from the decisive determination of his exit route.

I had worked through four Februaries to see this event, and I'm sure there are many details I have not been privy to. It seemed to me in my cursory visual inventory of the activities this last time that a great majority of those present were males. Whether this is a characteristic of the species or just a measure of a particular point in the mating sequence I don't know. I didn't stay long enough, or return on subsequent nights, to witness the females depositing their egg masses, the volume of which—many times their own body size—has always intrigued me.

And what will always elude me, I suppose, is more detailed insight into the fossorial behaviors of these colorful salamanders for the other 50-odd weeks of the year. How can creatures so beautiful content themselves with an existence so much out of the eyes of human observers, at least from the eyes of those who would appreciate and respect their existence?

The answer, of course, is clear, not only in terms of ensuring their protection from animal predators, but in the way in which humans, as a whole, have intentionally or unintentionally plundered or altered the surface and underpinnings of so much of the natural spheres of plant and animal diversity. As long as we don't poison the water in which they lay their eggs, Chatham's spotted salamanders seem to be in no danger of extinction. But it would be comforting to see a more active and informed approach to preserving these and other beautiful wild species in balance with the needs of human population growth and land development. ◆

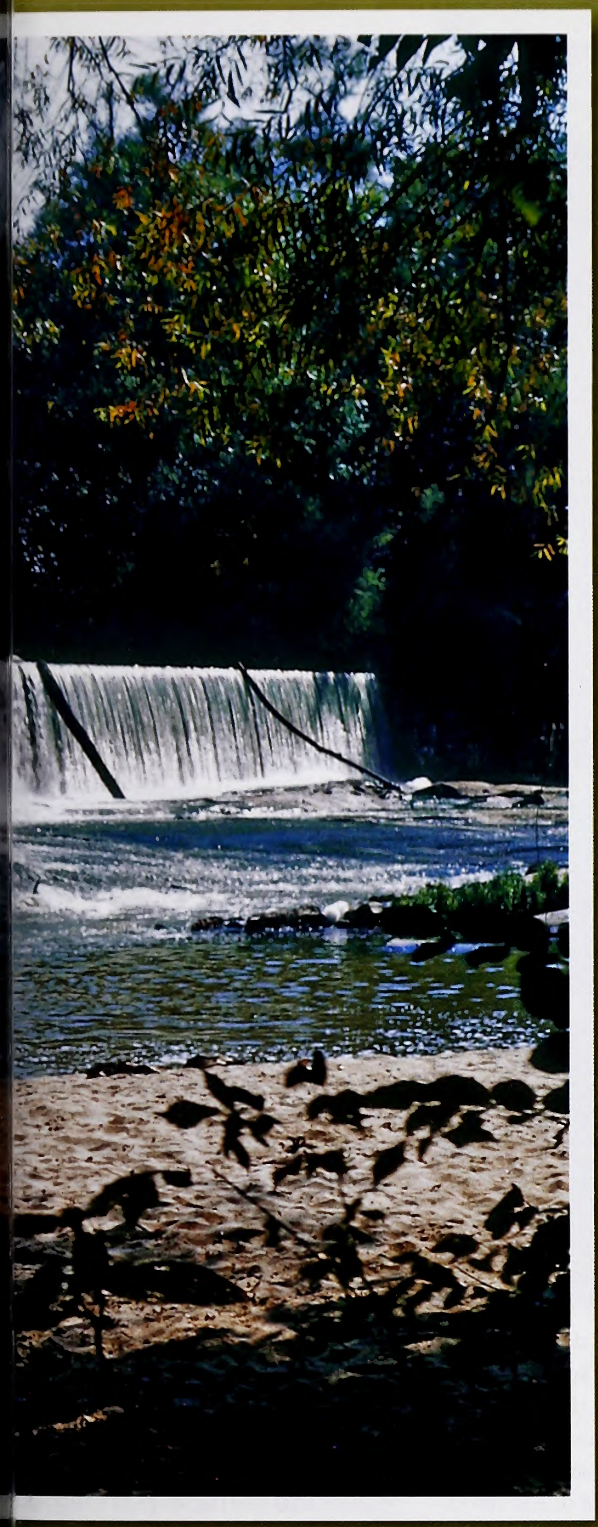
Bob Palmatier is a writer based in Durham and an occasional contributor to WINC. *Visit www.bobpalmatier.com to see more of his work.*

KEN TAYLOR/NCWRC

Removing Dams + Restoring River

A number of public and nonprofit partners are working to tear down decommissioned dams and build back river habitat.

WRITTEN BY **LYNNETTE BATT**



Thousands of dams across North Carolina are no longer used for milling or energy production, and could be candidates for removal. This is an old photo of Milburnie Dam on the Neuse River in Wake County, which has been the source of much debate over its potential removal. Advocates want to restore the river to its original flow, and opponents want to keep the historic structure.

Rivers are the lifeblood of our environment and our communities, and the healthiest rivers are those that flow freely. Yet the streams and rivers of the Southeast have been impacted by dams for hundreds of years. European settlers brought agriculture and development to the region in the 16th century, and it was not long before the need to process crops sent people to streams and rivers in search of power. As a result, tens of thousands of dams were built to support gristmills, cotton mills and textile mills from coast to Mountains.

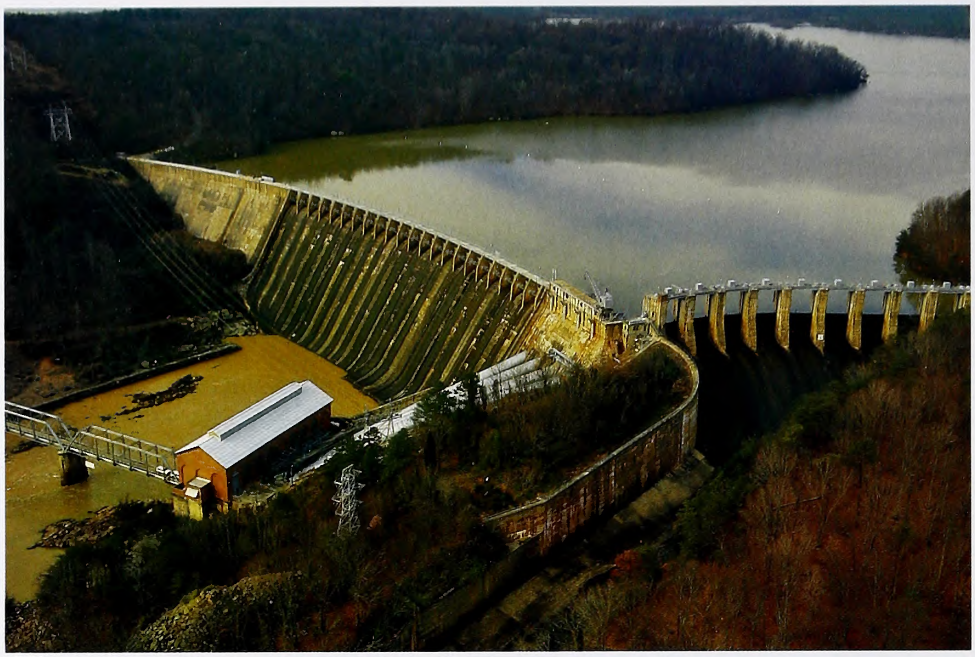
Today, between 15,000 and 20,000 dams block the streams and rivers in North Carolina, according an estimate by the nonprofit organization American Rivers. This adds up to approximately 150 to 200 dams in each county. Most of these dams no longer serve a purpose—not power, not flood control, not water supply and often not even recreation.

Beneficial Destruction

Mention the word dam, and many North Carolinians picture a big reservoir such as Lake Gaston or Jordan Lake. But these make up just a tiny fraction of the dams that exist. In fact, of those regulated by the state, just 3 percent are used as flood control, 1 percent as hydropower and 8 percent as water supply. Many of the rest are small, abandoned dams that serve only to block fish, impede recreation and threaten safety.

As North Carolina's economy evolved over the last half century, mills were shut down and their dams abandoned. These forgotten dams continue to block our rivers and cause a myriad of impacts to both people and nature. At the same time, our growing population has continued to build dams for water supply, recreation and power.

Removing outdated dams has become a popular and extremely successful tool for restoring streams and rivers around the country. Nonprofit groups such as American Rivers, along with governmental and non-governmental partners, have worked to remove more than 830 dams in the United States, reconnecting thousands of miles of rivers. The benefits of dam removal are many, including improved safety, healthier rivers, more abundant fish and wildlife, and enhanced recreation.



NCWRC

RESTORATION SYSTEMS LLC

Narrows Dam on the Yadkin River generates hydropower and impounds Badin Lake. It is an example of a major dam that would not be a candidate for removal. Carbonton Dam was removed in 2006, allowing the Deep River to flow freely for the first time in a century. Opposite page, top three photos: Steeles Mill Dam during removal and Hitchcock Creek after removal. Bottom photos: Dillsboro Dam during removal.

Public safety is a critical concern. Of the tens of thousands of dams in North Carolina, only a small fraction—about 4,700—are regulated. And because most dams are very old, often exceeding 100 years, dam failures are relatively common. More than 1,000 dams in our state are "high hazard," meaning that if they fail, they could result in injury, loss of property and loss of life due to flooding. Of these, 127 are "deficient," meaning they are structurally unsound. Being both "high hazard" and "deficient" is a dangerous combination, so if the dam is no longer being used, full removal is the best option.

Dam removal also has huge ecological benefits, making it an excellent way to restore rivers. Fish, mussels, crayfish, amphibians, insects and other aquatic species depend on healthy, free-flowing rivers to live and reproduce. Dams serve as barriers to the movement of these species and replace flowing river habitat with stagnant water in which many animals cannot live. This is a pa i cularly significant problem in the Sou e given that this region holds 62 percent f fish species, 91 percent of the mussel s o and 95 percent of the crayfish species entire United States.

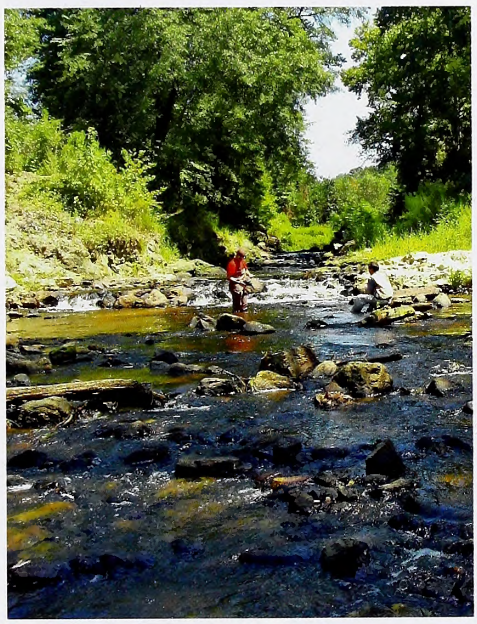
According to the N.C. Wildlife Actio Pl "habitat alteration from nonpoint-sou e pollution and flow alteration (i.e., imp u ments) is the primary cause of popula on declines for 72 percent of Southeastern s considered imperiled." Removing dar a other barriers reconnects fish and o e aquatic communities, restores their h it and improves water quality. It can also e restore natural flows to floodplains, w ch supports birds and other wildlife.

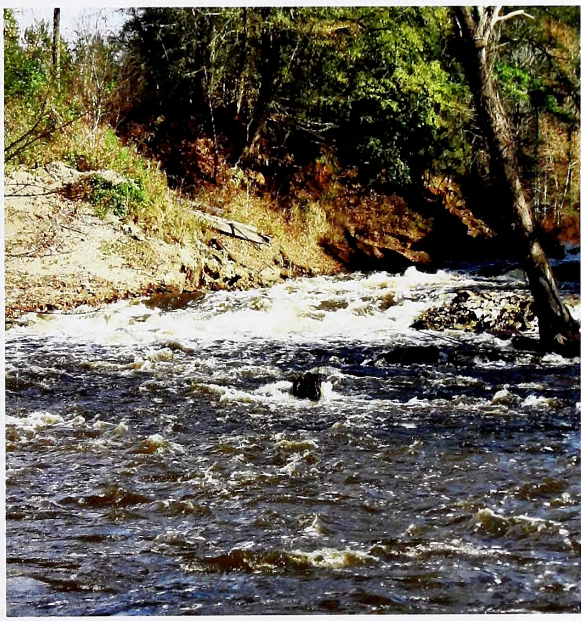
As Chris Goudreau, special project coo dinator with the N.C. Wildlife Resource Co mission (WRC) puts it, "In the past d ad the WRC has put considerable effort to studying and restoring native aquatic s cies many of which are listed as threatene or endangered. In some cases dams are on tributing to low fish and mussel popu tio by fragmenting their habitats, alterin wa quality and physical habitat and crea ng conditions more suitable for non-na ve species. Dam removal can be an impo an tool in our efforts to restore native spe es

Restored rivers have many benefits or people, too. Clean, free-flowing rivers ov high-quality recreation opportunities uch as canoeing, fishing, swimming, and en hiking and camping on the banks. Th in turn supports the local economy by ing ing in tourism and recreation dollars nd affords an opportunity to reconnect ppl to nature. Economic studies have fou d th property values are higher along free-ow wi streams and rivers than they are next impounded water. Communities down rea of dams that use the river as a drinkin wa source also benefit from more reliable low and have less risk of flooding if the am were to fail.

Measures of Progress

In North Carolina, more than a dozen dam have been removed, reconnecting hu dred of miles of rivers. A diverse group inc din WRC, American Rivers, the U.S. Fish nd Wildlife Service (USFWS), the N.C. Dep ment of Environment and Natural Res rces the National Oceanic and Atmosphe c





Restored rivers have many benefits for people, too. Clean, free-flowing rivers provide high-quality recreation opportunities such as canoeing, fishing, swimming, and even hiking and camping on the banks. This in turn supports the local economy.

PHOTOGRAPHS COURTESY OF AMERICAN RIVERS

ıistration (NOAA), the U.S. Army
of Engineers (Corps), the U.S. Environ-
l Protection Agency, Resource Conser-
and Development Districts (RC&Ds),
ıonprofit groups and private companies
vorked together to make these projects
ess. This group, led by American
, has recently re-established the N.C.
Removal Task Force to guide project
ies and state policy.
the Piedmont and Coastal Plain, dam
als that restore habitat for anadromous
hat is, those that migrate from the ocean
rs to spawn) remain top priorities. The
spawning migrations of shad, river
ıg, sturgeon and striped bass once sup-
l commercial and subsistence fisheries
ımunities on the coast and in Piedmont
But with the construction of dams
ing upstream migrations and impound-
'er habitat, some of these fisheries have
peared. In fact, migratory fish have
reduced to an estimated 5 percent of
ıistoric population levels due to dams,
ıt loss and overfishing.
ere has been progress in restoring habitat
gratory fish. A suite of dam removals
Neuse River basin — including Quaker
Dam on the mainstem Neuse and
y Hospital, Rains Mill and Lowell Mill
on the Little River — have opened more
200 miles of river from the coast to the
ıont. Partners including the USFWS,
orps, Progress Energy and Restoration
ns LLC made these projects possible.
these removals, upstream migration for
n the Neuse River now ends at Milburnie
218 miles from the Pamlico Sound. A
o remove the Milburnie Dam, currently
r review by the Corps, would open an
ıional 15 river miles for migratory fish
ning. This would make the Neuse the
river in the state with its historic range
ıh migration fully restored.
ike Wicker, a fisheries biologist and
al program coordinator for the USFWS,
that his agency strongly supports the
val of the Milburnie Dam and other
s to restore migratory fish runs. "Migra-
ish are an important part of the coastal
cean food chain," Wicker says. "Ameri-
had and river herring fry feed a num-
f sport fish found in the river system
long the coast, including striped bass,
ıder, redfish, speckled trout, tarpon,
kerel and tuna. Fishermen should see

Dam removal benefits the small river creatures that indicate water quality and make up the bottom of the food chain such as the Kanawha minnow, the American eel (this one captured on Hitchcock Creek after removal of Steeles Mill Dam) and the Tar River spiny mussel. Opposite page: Rains Mill Dam on the Little River before it was removed in 1999.

KEN TAYLOR / NCWRC

THE CATENA GROUP

KEN TAYLOR / NCWRC

an increase in all of these fish as a result of restoring shad and herring runs."

Another project, the removal of the Steeles Mill Dam last year, opened up nearly 15 miles of river for migratory fish in Hitchcock Creek in southern North Carolina. Led by the City of Rockingham, and supported by NOAA, American Rivers, the N.C. Division of Water Resources and Pilot View RC&D, the removal of the 110-year-old, 15-foot-high dam took less than a week. With the dam out of the way, the community is now gearing up for the establishment of a 12-mile-long "blue trail" for canoeing, kayaking and fishing along the creek. Matt Rice, associate director of conservation with American Rivers, is enthusiastic about this innovative approach. "Tying together recreation and restoration projects is a great way to reconnect people with healthy rivers, with nature," Rice says.

To assist the restoration of migratory species, funding is now available for stream barrier projects (dam removals and culvert replacements) that benefit these species through a joint partnership between American Rivers and NOAA. This Community-Based River Restoration Program has provided some $3.8 million to support more than 120 community-driven river restoration projects throughout the country. The program benefits fish species that migrate between freshwater and saltwater, such as American shad, river herring and American eels.

Help for Threatened Wildlife

Threatened and endangered species also high priorities from the coast to Mountains, and dam removals have s some great success in helping them. F example, the Carbonton Dam remov the Deep River in the Piedmont bene the federally endangered Cape Fear sh a small fish that lives nowhere else i world. Tim Savidge of the Catena Gro environmental consulting company th forms biological surveys, says, "The Fear Shiner was fairly quick to recol the restored river reach, as it was fou eight different locations throughout former impoundment in just the sec year following removal."

Martin Doyle, a professor of river s with UNC-Chapel Hill, also notes th Carbonton Dam removal is the only s restoration project he's seen outside s areas in the Pacific Northwest wher endangered fish species was found. V asked what he thinks of removing da restore streams and rivers, Doyle re "Dam removal is the only thing that w aside from extremely long, large tradi restoration projects, and those are too sive to be likely."

Mussels are another key focus w regard to threatened and endangered Nearly 60 percent of mussel species i Carolina are imperiled, and accordin N.C. Wildlife Action Plan, "nonpoi source pollution and the effects of da impoundments are the leading histor current threats to freshwater mollu Mussel larvae attach to the gills of s host fish, using this as a way to colo new stretches of river. Dams block host fish and trap sediments that pr mussels from attaching to the river

Savidge notes that "the removal Carbonton Dam has resulted in rec zation of the former impoundment number of rare freshwater mussel sp such as the yellow lampmussel, Sava lilliput and notched rainbow." He r another major success for a federally gered species, the Tar River spiny m which was found in August 2010 i former impoundment of the Lowell the Little River. That makes it the s endangered species found in any st restoration site in North Carolina.

ıe Mountains, dam removals such as
Pine Dam on the North Toe River
ed by USFWS and Blue Ridge RC&D)
llsboro Dam on the Tuckasegee River
ed by Duke Energy with help from
FWS, WRC and others) have restored
habitat for the Appalachian elktoe
, a federally endangered species.
S biologist Mark Cantrell is excited
he project. "The benefits of removing
ro Dam will extend a great distance
m and downstream of the site,
ing conditions for rare fish and mus-
well as fish popular with anglers,"
ll says. "We want to take a fresh look
dams affect rivers in North Carolina
y may have outlived their intended
e, yet still fragment river habitats and
the recovery of endangered fish and
pecies. The Fish and Wildlife Service
en and will continue to be a partner
work."
ddition to mussels, trout are a restor-
arget in the Mountains. Like migra-
sh, native brook trout populations
een reduced to an estimated 5 percent
historic levels throughout the eastern
States. Both dams and poorly designed
ıs block trout movement, inundate
habitat and cause waters to warm
ırally — a major impact to this cold-
ish.
oking to the future, the N.C. Dam
al Task Force and other restoration
ents envision the removal of dozens
ated dams each year in North Carolina,
ing done in Pennsylvania, Wisconsin
her states. Nearly 15 projects are cur-
under consideration. Given the sheer
r of dams, their known impacts and
portance of healthy rivers to support
te's incredible biodiversity and grow-
pulation, we cannot afford a slower
North Carolina citizens can help by
raging these projects in their com-
ies to restore healthy, free-flowing
for us, for nature and for future
tions to enjoy. ◆

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te Batt is the associate director for river tion in North Carolina with American Contact her at lbatt@americanrivers.org) 682-3197. Learn more about American including its Community-Based River ation Program, at www.american org/our-work/restoring-rivers/dams.

"Dam removal is the only thing that works aside from extremely long, large traditional restoration projects, and those are too expensive to be likely."

–MARTIN DOYLE, UNC PROFESSOR OF RIVER SCIENCE

KEN TAYLOR/NCWRC

Major dam removals in North Carolina, 1988–2010

DAM NAME	STREAM	RIVER BASIN	DATE REMOVED
ALTAPASS DAM	ROSES CREEK	FRENCH BROAD	2010
BUCKHORN DAM	BUCKHORN CREEK	CAPE FEAR	2010
DILLSBORO DAM	TUCKASEGEE RIVER	LITTLE TENNESSEE	2010
STEELES MILL DAM	HITCHCOCK CREEK	YADKIN–PEE DEE	2009
SPRUCE PINE DAM	NORTH TOE RIVER	FRENCH BROAD	2009
CARBONTON DAM	DEEP RIVER	CAPE FEAR	2006
LOWELL MILL DAM	LITTLE RIVER	NEUSE	2005
FREEDOM PARK DAM	LITTLE SUGAR CREEK	CATAWBA	2002
UNNAMED DAM	MARKS CREEK	NEUSE	2002
RAINS MILL DAM	LITTLE RIVER	NEUSE	1999
QUAKER NECK DAM	NEUSE RIVER	NEUSE	1998
CHERRY HOSPITAL DAM	LITTLE RIVER	NEUSE	1998
ASH BEAR PEN DAM	COLD PRONG RIVER	WATAUGA	1990
FORNEY RIDGE DAM	FORNEY CREEK	LITTLE TENNESSEE	1988

Of all North Carolina's natural features, few are more remarkable than the Carolina bays. These elliptical depressions are

Strange Bays Indeed

written by Jeff Beane / illustrations and nature activity by Anne M. Runyon

Home to amazing plants and animals, some are large and some are small. But each one is unique, with its own special characteristics.

WHAT ARE THEY?

Carolina bays are oval-shaped depressions in the Atlantic Coastal Plain. Not to be confused with bays found in the ocean, Carolina bays are named for some of the evergreen shrubs—sweet bay, red bay, swamp bay, loblolly-bay—that grow in and around many of them. However, not all Carolina bays contain these shrubs, nor are bays characterized by any specific vegetation type. Sometimes the terms "shrub bog" or "pocosin" (an Algonquin word meaning "swamp-on-a-hill"), are used to refer to some bays, especially those with thicker vegetation. But most bays are actually neither of these.

Some of the smallest Carolina bays are fewer than 50 yards in diameter. The larges Columbus County's Lake Waccamaw, encompasses about 14 square miles and is 5 miles across. Although the largest bays are permanent lakes, most hold water only intermittently. Nearly all are oriented in the same direction: from northwe to southeast. Most are bordered by a rim of white sand, which is usually most prominent along the southeast side. There may once have been as many as 600,000 bays, but many of the smaller ones have been ditched, drained, fille or otherwise altered or destroyed.

POND CYPRESS

LITTLE GRASS FROG

ORNT CHORU F

Open, grassy, ephemeral, clay-based bay like Goose Pond Bay in Robeson County support particularly high biodiversity. O few remaining examples of this type of b are important habitat for some of our rar plants and animals.

SANDHILLS CRAYFISH

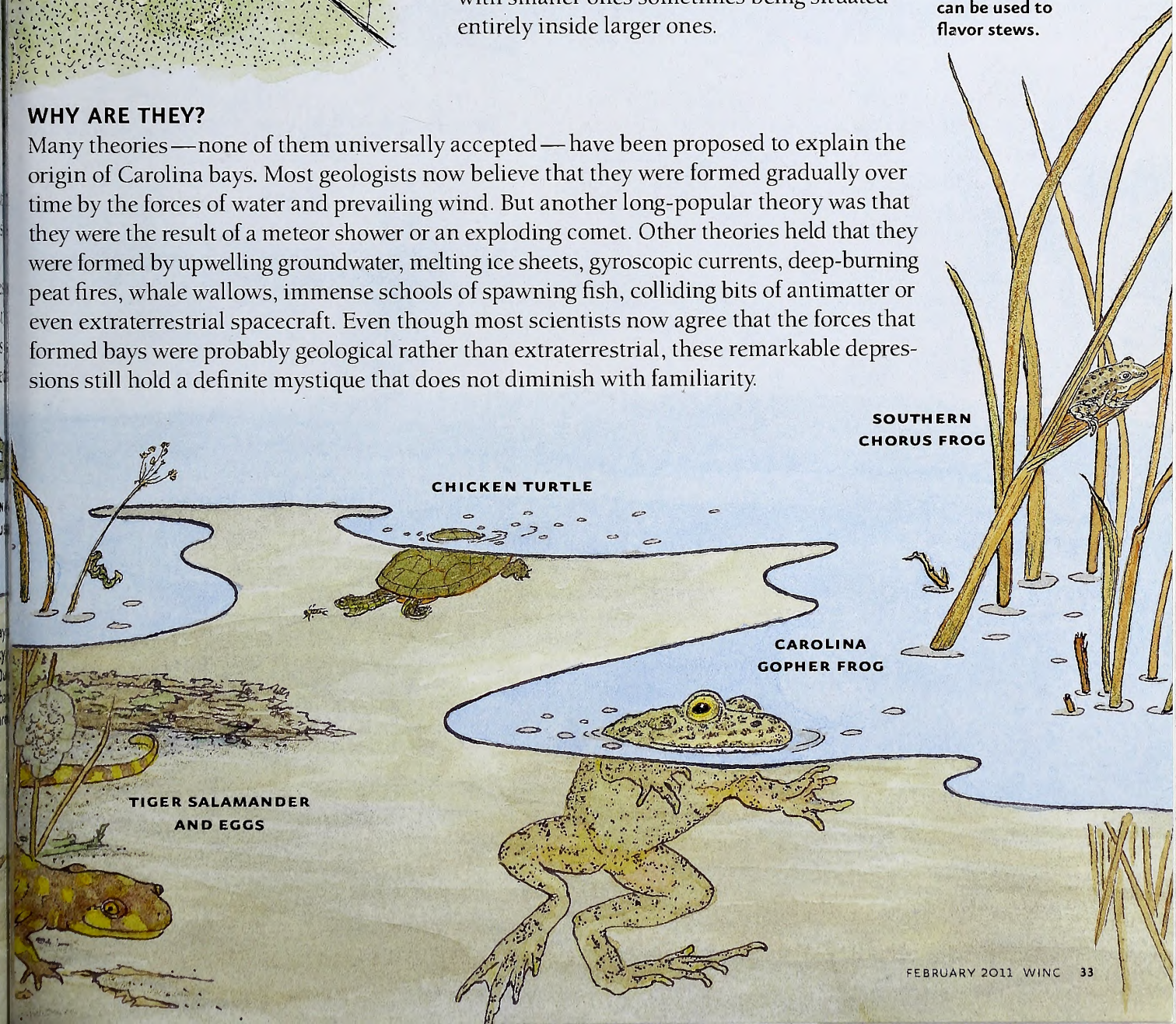
WHERE ARE THEY?

Carolina bays occur mostly in the Coastal Plain of the Carolinas and Georgia, but a few are found as far north as Maryland, Delaware, and New Jersey, and as far south as northeastern Florida. In North Carolina, the highest concentrations of bays are in the southern Coastal Plain, especially in portions of Bladen, Columbus, Cumberland, Hoke, Robeson and Scotland counties. In some of these areas, bays are so densely clustered that some overlap, with smaller ones sometimes being situated entirely inside larger ones.

Red bay is evergreen, and its spicy leaves can be used to flavor stews.

WHY ARE THEY?

Many theories—none of them universally accepted—have been proposed to explain the origin of Carolina bays. Most geologists now believe that they were formed gradually over time by the forces of water and prevailing wind. But another long-popular theory was that they were the result of a meteor shower or an exploding comet. Other theories held that they were formed by upwelling groundwater, melting ice sheets, gyroscopic currents, deep-burning peat fires, whale wallows, immense schools of spawning fish, colliding bits of antimatter or even extraterrestrial spacecraft. Even though most scientists now agree that the forces that formed bays were probably geological rather than extraterrestrial, these remarkable depressions still hold a definite mystique that does not diminish with familiarity.

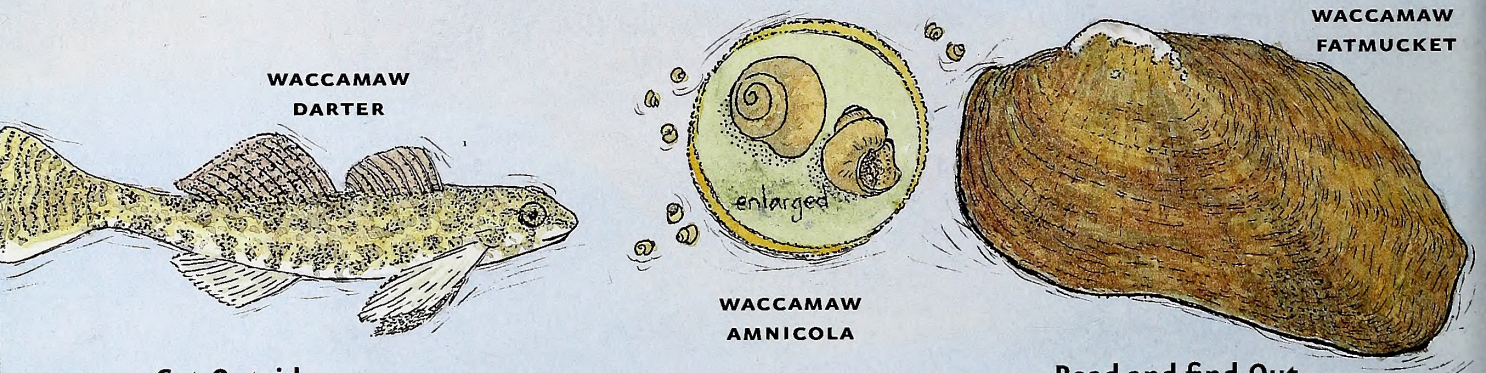


BAYS THESE DAYS

Today, there is more scientific interest in the ecology of Carolina bays than in how they were formed. A host of plants and animals, many of them rare or endangered, live in bays, and some are completely dependent upon them. Lake Waccamaw has at least seven species (three fish, three snails and a mussel) that are endemic—that is, found there and nowhere else. In North Carolina, most of the dwarf salamander's habitat consists of clay-based cypress bays; these also represent some of the best remaining tiger salamander breeding sites. Other rare animal species making heavy use of Carolina bays include the Carolina gopher frog, ornate chorus frog, Mabee's salamander, chicken turtle and wood stork. At least 26 amphibian species have been documented from one Robeson County bay—a virtually unheard-of diversity. The long list of rare plant species occurring in bays or along their sand rims includes Canby's dropwort, sarvis holly, awned meadow-beauty, threadleaf sundew, Boykin's lobelia, Tracy's beakrush, Florida goober grass and Michaux's sumac.

SARVIS HOLLY

Not only are Carolina bays distinctive geologi features as a group, but each individual bay is a unique; no two are exactly alike. Some are clay-ba some peat-based. Some are densely canopied; oth are open. Virtually every one contains a differen assemblage of plants and animals. Unfortunately, were converted to agriculture before we gained understanding necessary to appreciate them. Tho bays are gone forever. Will we find the wisdom to tect the remaining examples of these wonderfully terious and unique elements of our natural world we can't agree on their past, maybe we can agree their future.



Get Outside

Several of North Carolina's larger bay lakes are readily accessible. These include Lake Waccamaw, Lake Phelps (some say this big lake is a bay; some say it isn't), and Jones, Singletary, Bay Tree, Horseshoe and Little Singletary lakes. Some of these are protected as state parks, as game lands or as part of Bladen Lakes State Forest. White Lake, a large bay lake near Elizabethtown, is a popular commercial resort. If you ever have a chance to fly over the Coastal Plain of the Carolinas in a small aircraft or helicopter (or a large passenger plane on a clear day), be sure to look for the elliptical shapes of the bays—the visual impact of their shape and orientation is more easily appreciated from the air. Even driving through rural portions of Hoke and Robeson counties, you may see large, dark, oval spots in plowed fields that were small bays before they were converted to agriculture. The Nature Conservancy protects several of the best remaining examples of the smaller and more biologically diverse clay-based bays, or portions of them. For more information on these properties, including occasional field trips, call 919-403-8558 or visit www.nature.org.

Read and find Out

- "The Mysterious Carolina Bays" by Hen Savage, Jr., University of South Carolin Press, 1982.
- "The Riddle of the Carolina Bays" by Ke Krajick, Smithsonian Magazine, September 1997.

In *Wildlife in North Carolina:*

- "The Crisis in Habitat, Part I: Bays, Bea Greenbacks" byLawrence S. Earley, Ma
- "God's Ponds" by Jeff Beane, March 19

Find out more about Project WILD Work and literature at the Wildlife Commissio site at www.ncwildlife.org.

Make a Gopher Frog Hat

1) Cut out your frog head along the fat orange line.

2) Cut along the thin orange lines, allowing the eyes to pop up.

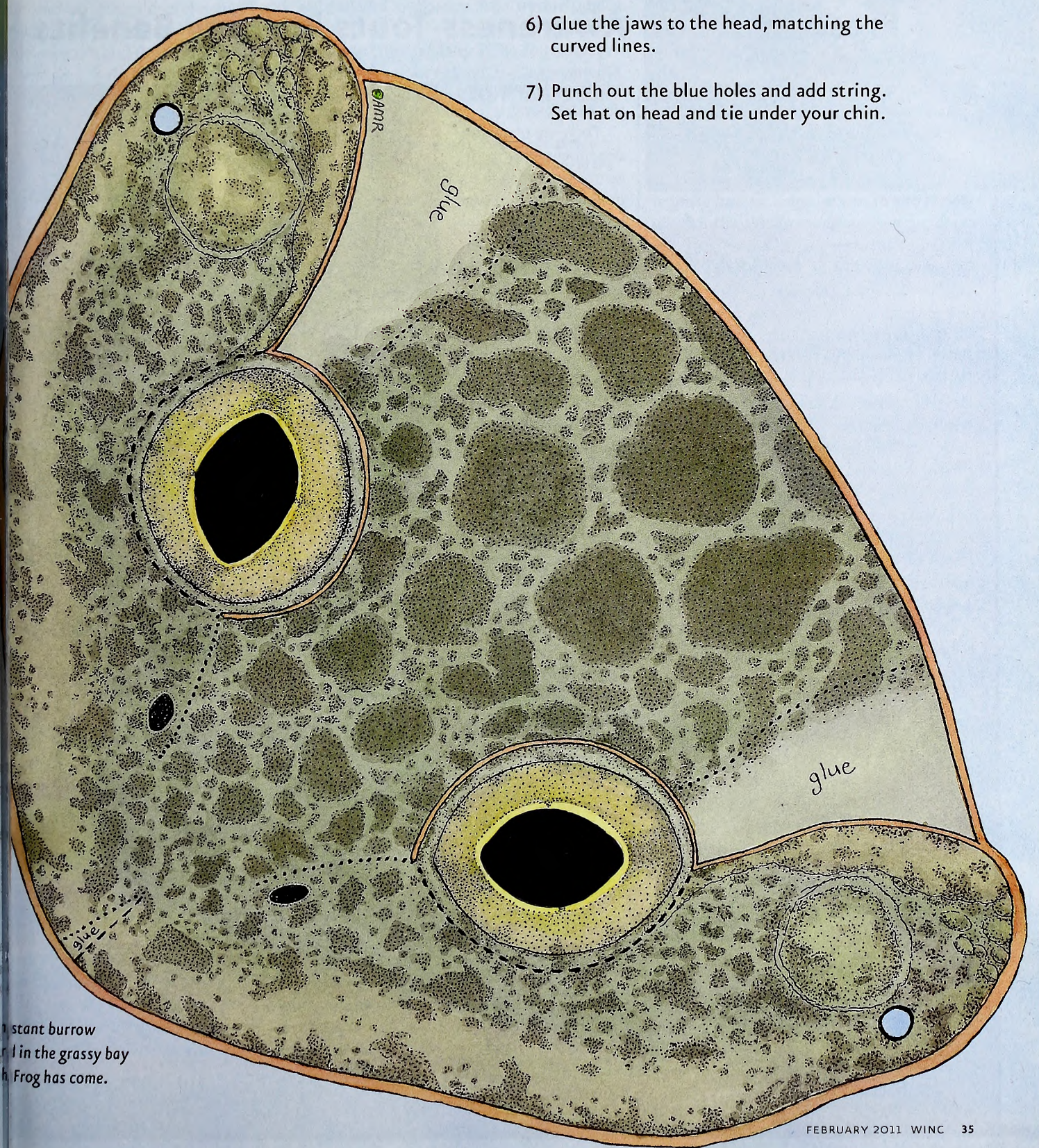
3) Crease down along ···· lines on each side of head, sculpting your frog's snout and the back of his head.

4) Pinch down along ···· line on tip of nose and fold over at the ···· line to sculpt nose. Glue shut and secure with tape on the backside.

5) Crease up slightly along ---- lines under eyes, sculpting the cheeks and helping the eyes stand up more.

6) Glue the jaws to the head, matching the curved lines.

7) Punch out the blue holes and add string. Set hat on head and tie under your chin.



stant burrow
l in the grassy bay
Frog has come.

back porch

NEWS and NOTES

Edited by Jim Wilson

Prescribed Fire Awareness Touts Burning Benefits

Help raise awareness of the benefits of prescribed fire to wildlife and plants during Prescribed Fire Awareness Week, scheduled this year for Feb. 7 to 13.

The N.C. Wildlife Resources Commission is one of several agencies and groups teaching the importance of prescribed fire in North Carolina ecosystems. Learn from statewide activities, events, demonstrations and displays. Visit www.ncprescribedfire council .org to find events in your area.

"Prescribed fire is an important tool for forestry and wildlife habitat management," said N.C. Prescribed Fire board member Dean Simon, a wildlife forester with the Wildlife Commission. "Many plants and animals need prescribed fire to survive and thrive. Prescribed burns also reduce the threat of large, dangerous wildfires by reducing fuels."

Fire once occurred naturally across North Carolina. Low-intensity fires burned every few years, fueled by grass, leaves, pine straw and other forest debris. They kept the forest open, allowing sunlight to penetrate to its floor and reducing buildup of dangerous fuel loads. Fire suppression altered the landscape, allowing fuels to accumulate and putting people and communities in jeopardy.

There are many fire-dependent ecosystems across the state from the mountains to the coast, including most oak and pine forests. Without fire, many native plants and animals will disappear due to lack of food, habitat and conditions needed for them to exist.

Prescribed burn participants receive extensive training to ensure that they are careful to protect surrounding communities, themselves and the land they are working to restore. Fire experts do a great deal of work before the burn. They create a burn plan, which includes smoke management details, fire control measures, acceptable weather parameters, equipment and personnel needs. The plan also details how the ecosystem will benefit from fire.

MELISSA MCGAW / NCWRC

Prescribed burns, such as this on Sandhills Game Land, benefit both and animals.

The N. C. Prescribed Fire Council together natural resource professionals and private land managers, and other support the use of prescribed fire.

Commission Repairs Dam at Caswell

Workers from the N.C. Wildlife Resources Commission are repairing an aging dam on High Rock Pond on the R. Wayne Bailey-Caswell Game Lands in preparation for opening a Public Fishing Area.

The work includes removing the old water-control structure that had deteriorated and started to leak. Workers from the commission's Division of Engineering Services and Division of Inland Fisheries are cutting into the dam and adding a more substantial structure that should give better results by cradling a 12 inch PVC pipe in concrete.

When the dam is complete, High Rock Pond, which is just off Stephentown Road in Yanceyville, will be refilled.

For more information on fishing in North Carolina's inland waters, including a list public fishing areas, visit www.ncwildlife.org /Fishing/Fishing_Maps_Location.htm.

e NEWSLETTER

Get N.C. Wildlife Update—news including season dates, bag limits, legislative updates and more—delivered to your Inbox from the N.C. Wildlife Resources Commission. Sign up at www.ncwildlife.org/enews.

NCWRC's Rorrer Passes Away Unexpectedly

Rorrer, a longtime hunter education cialist with the N.C. Wildlife es Commission who taught thousands n Carolinians about respect and enjoy- the outdoors, died unexpectedly in r at age 52.

d Rorrer was the caliber of man who, r personally or professionally, repre- conservation and this agency in the ssible way," said Col. Dale Caveny, the Wildlife Commission's Division Enforcement, which administers the Hunter Education Program. "He was outdoorsman and a great ambas- or hunting and fishing. His passing leaves a void and, for those who knew him, a real hurt."

As a hunter education specialist, Rorrer was tireless as he coordinated activities with volunteer instructors; assisted youth, church and civic groups with programs and events; and provided instruction in his own scheduled hunter education courses. He was a leader in the Youth Hunter Safety Skills Tournaments and helped bolster North Carolina teams and individuals to the top levels of competition.

Fred Rorrer taught thousands of North Carolinians how to respect and enjoy the outdoors safely.

MELISSA MCGAW / NCWRC

Wetlands May Be at Increased Risk from Climate Change

ny coastal wetlands worldwide — including North Carolina's 'amlico and Albemarle sounds — may be more sensitive than sly thought to climate change and sea-level rise projections 21st century.

Geological Survey scientists made this conclusion from an ional research modeling effort published today in the journal *sical Research Letters*, a publication of the American ysical Union. Scientists identified conditions under which wetlands could survive rising sea level.

g a *rapid* sea-level rise scenario, most coastal wetlands world- ill disappear near the end of the 21st century. In contrast, he *slow* sea-level rise projection, wetlands with low sediment ility and low tidal ranges are vulnerable and may drown. r, in the slow sea-level rise projection, wetlands with higher nt availability would be more likely to survive.

ral coastal marshes along the east coast of the United States, nple, have limited sediment supplies and are likely to disappear tury. Vulnerable east coast marshes include the Plum Island (the largest estuary in New England) and coastal wetlands marle-Pamlico system (the second-largest estuary in the States).

urate information about the adaptability of coastal wetlands erations in sea-level rise, such as that reported in this study, arrow the uncertainties associated with their disappearance," GS scientist Glenn Guntenspergen, an author of this report. search is essential for allowing decision makers to best man- l tradeoffs between economic and conservation concerns."

vious assessments of coastal wetland responses to sea-level ve been constrained because they did not consider the of wetlands to naturally modify their physical environment tation," said USGS scientist Matt Kirwan, an author of this "Failure to incorporate the interactions of inundation, on and sedimentation in wetlands limits the usefulness of essments."

USGS scientists specifically identified the sediment levels and tidal ranges (difference between high and low tide) necessary for marshes to survive sea-level rise. As water floods a wetland and flows through its vegetation, sediment is carried from upstream and deposited on the wetland's surface, allowing it to gain elevation. High tidal ranges allow for better sediment delivery, and the higher sediment concentrations in the water allow wetlands to build more elevation.

Coastal wetlands provide critical services such as absorbing energy from coastal storms, preserving shorelines, protecting human populations and infrastructure, supporting commercial seafood harvests, absorbing pollutants and serving as critical habitat for migratory bird populations. These resources and services will be threatened as sea-level rise inundates wetlands.

The study, "Limits on the Adaptability of Coastal Marshes to Rising Sea-Level," can be found online, or contact USGS to have a copy e-mailed to you.

KEN TAYLOR / NCWRC

CALENDAR OF EVENTS

FRIDAY–SUNDAY, FEBRUARY 11–13

Check out the new 2011 N.C. Duck Stamp print at the 16th annual East Carolina Wildlife Arts and Decoy Carving Festival in Washington. Approximately 100 exhibitors will be on hand. The festival also features calling and carving competitions and retriever demonstrations.
Visit www.eastcarolinawildfowlguild.com.

FRIDAY–MONDAY, FEBRUARY 18–21

Take part in the 14th annual Great Backyard Bird Count. Anyone may take part, and it's as simple as spending 15 minutes a day counting your local birds. Checklists and instructions are available at: www.birdsource.org/gbbc

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson @ncwildlife.org, or call (919) 707-0177.

Bell's Bridge Access Gets Renovations

N.C. Wildlife Resources Commission crews have recently completed renovations on the Bell's Bridge Boating Access Area in Edgecombe County. The site, at the south end of the Tar River Bridge off N.C. 33, has a new ramp, floating docks and an ADA compliant parking lot. The project was partially funded through the Federal Aid in Sport Fish Restoration program, along with North Carolina motorboat registration fees.

"The Bell's Bridge Boating Access Area gives boaters and anglers convenient, easy access to the Tar River," said Erik Christofferson, chief of the commission's Division of Engineering Services. "It's been completely refurbished, and we are thrilled to offer boaters this improved access as they head out to the Tar River."
For more information on boating in North Carolina, including an interactive map of access areas, visit www.ncwildlife.org/boating_waterways.

New Seatrout Regulations Suspende

ILLUSTRATION BY DUANE RAVER

In mid-January, N.C. Division of Marine Fisheries (DMF) director Louis Daniel closed all coastal waters to commercial and recreational spotted seatrout harvest for an indefinite period. The action was taken in response to cold stun events in Rose Bay, Juniper Bay, Pungo River, Campbell Creek, Turnigan Bay, Spooners Creek and other waters. The intent of the closure is to prevent the harvest of vulnerable cold-stunned fish, which may recover with warming temperatures.

In approving the Spotted Seatrout Fishery Management Plan in November, the N.C. Marine Fisheries Commission (MFC) authorized Daniel to temporarily close harvest in the event of a cold stun event. The MFC is scheduled to review the closure on Feb. 11.

When the new management plan was announced in the fall of 2010, DMF and the N.C. Wildlife Resources Commission set new regulations for spotted seatrout for recreational and commercial fishermen in North Carolina coastal and inland waters. Although the coastal regulations are now suspended, the inland regulations remain in effect.

In the management plan, the recreational bag limit for spotted seatrout decreased from 10 fish to six fish per person per day, with no more than two of the six fish greater than 24 inches in length. Th existing 14-inch minimum size l remained in effect Commercial harves spotted seatrout (possession and sa was prohibited year-round from mid on Friday to midnight on Sunday eac The current 14-inch minimum size lir remain in effect.

In inland waters, under the jurisd of the Wildlife Commission, the min size limit remains at 12 inches and th limit at 10 fish per person per day th July 31. The minimum size limit for s seatrout will increase to 14 inches in fishing waters on Aug. 1. The daily cre will remain at 10 fish per day.

For more information on the coas regulations, contact David Taylor, Fis Management Section chief with the Division of Marine Fisheries at (252) 8074 or david.l.taylor@ncdenr.gov. the new spotted seatrout regulations the Division of Marine Fisheries web www.ncfisheries.net.

For information on inland regula contact Christian Waters with the W Commission at (919) 707-0223 or chr waters@ncwildlife.org. View other r tions for inland waters on the comm website at www.ncwildlife.org.

IN SEASON

This month, these seasons are open in North Carolina:

Bobcat: Through Feb. 28.
Canada Goose and White-Fronted Goose: Resident Population Zone through Feb. 5.
Common Snipe: Through Feb. 26.
Crow: Through Feb. 28.
Light Geese (Snow, Blue and Ross'): Through March 9.
Pheasant: Through Feb. 1.
Quail: Through Feb. 28.
Rabbit: Through Feb. 28.
Raccoon and Opossum: Through Feb. 28.
Ruffed Grouse: Through Feb. 28.
Squirrel: Gray and red through Feb. 28.
Wild Boar: Through Feb. 28 only in Cherokee, Clay, Graham, Jackson, Macon and Swain counties. In the other 94 counties of the s feral hogs are not considered to be wild b and the commission does not regulate th
Youth Waterfowl Day: Feb. 5 (Youth mu 15 years of age or younger and accompani a properly licensed adult. The adult can n hunt but may participate in other season are open on the special youth day.

There is no closed season or bag limit for gr coyote, striped skunk, nutria and armadill is an open season for taking beaver with fir bow and arrow during any other open se the taking of wild animals.

Check the *2010–2011 North Carolina Inland Hunting and Trapping Regulations Digest* for b and applicable maps or visit www.ncwildl

The Wildlife Endowment Fund

An Investment for the Future

Established in 1981, the Wildlife Endowment Fund allows the Wildlife Resources Commission to accept tax-deductible contributions for wildlife conservation. Money from the sale of lifetime licenses is also placed in this fund. Your donation or purchase will ensure that North Carolina will have a rich wildlife heritage for generations to come.

Lifetime License Form

Infant and Youth *(check appropriate block)*:

- ☐ Sportsman Infant $200
  (under 1 year old—Application must be received before applicant has attained 1 year of age.)
- ☐ Unified Sportsman/Coastal Recreational Fishing Infant $275
  (under 1 year old—Application must be received before applicant has attained 1 year of age.)
- ☐ Sportsman Youth $350
  (ages 1 through 11—Application must be received before applicant has attained 12 years of age.)
- ☐ Unified Sportsman/Coastal Recreational Fishing Youth $450
  (ages 1 through 11—Application must be received before applicant has attained 12 years of age.)

A copy of the birth certificate must accompany applications for infant and youth licenses. Birth certificate documentation cannot be returned.

Note: Pending satisfactory completion of the hunter safety course, persons who possess infant or youth licenses may exercise the privileges thereof when accompanied by an adult who is properly licensed to hunt in North Carolina. "Accompanied" is defined as maintaining a proximity to the hunter which enables the adult to monitor the activities of, and communicate with, the hunter at all times.

Adult (age 12 or older) *(check appropriate block)*:

- ☐ Comprehensive Inland Fishing. $250
  (N.C. residents only—includes basic inland fishing, trout & trout waters on game lands)
- ☐ Comprehensive Hunting. $250
  (N.C. residents only—includes basic hunting, big game, game lands & N.C. waterfowl)
- ☐ Sportsman. $500
  (N.C. residents only age 12 or older—includes basic hunting & inland fishing, big game, game lands, trout & N.C. waterfowl)
- ☐ Coastal Recreational Fishing $250
  (N.C. residents only—includes coastal recreational fishing)
- ☐ Unified Sportsman/Coastal Recreational Fishing $675
  (N.C. residents only—includes same privileges as the Sportsman, plus coastal recreational fishing)

A federal waterfowl stamp must be purchased separately for all N.C. hunting licenses.

Note: On or after July 1, 1991, a person, regardless of age, may not procure a hunting license or hunt in North Carolina without producing a certificate of competency for completing the hunter safety course or a hunting license effective prior to July 1, 1991, or by signing the statement below that he or she had such a license.

Check appropriate block and attach required copy:

- ☐ Copy of Prior Year Hunting License
- ☐ Copy of Hunter Safety Certificate of Competence
- ☐ In lieu of copy, I am signing the statement below:

Statement: I certify that I was a licensed hunter prior to July 1, 1991.

Signature _____ Date _____

Visit us online at www.ncwildlife.org or call 1-888-248-6834 for a complete list of lifetime licenses, including those for nonresidents and 65 and older.

Lifetime License

Complete the following information if applying for a lifetime license. Be sure to check appropriate block(s) on reverse side ***(please print legibly)*****:**

Name of Applicant _____

Daytime Phone _____

Mailing Address _____

Resident Address _____

County _____ Date of Birth _____ Driver License # _____

E-mail Address _____

Is this license a gift? ☐ Yes ☐ No If yes, mail license to ☐ Donor or ☐ Applicant.

License Donor's Name *(if applicable)* _____

Donor's Telephone # _____

Donor's Mailing Address _____

City _____ State _____ Zip _____

Method of Payment: ☐ Check ☐ VISA ☐ MasterCard

Acct. # _____ Expires _____

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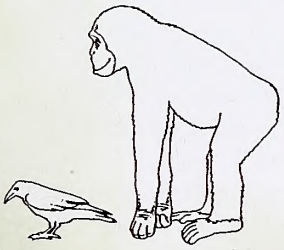
Why Are Ravens So Smart?

Written by Clyde Sorenson
Illustrated by Jim Brown

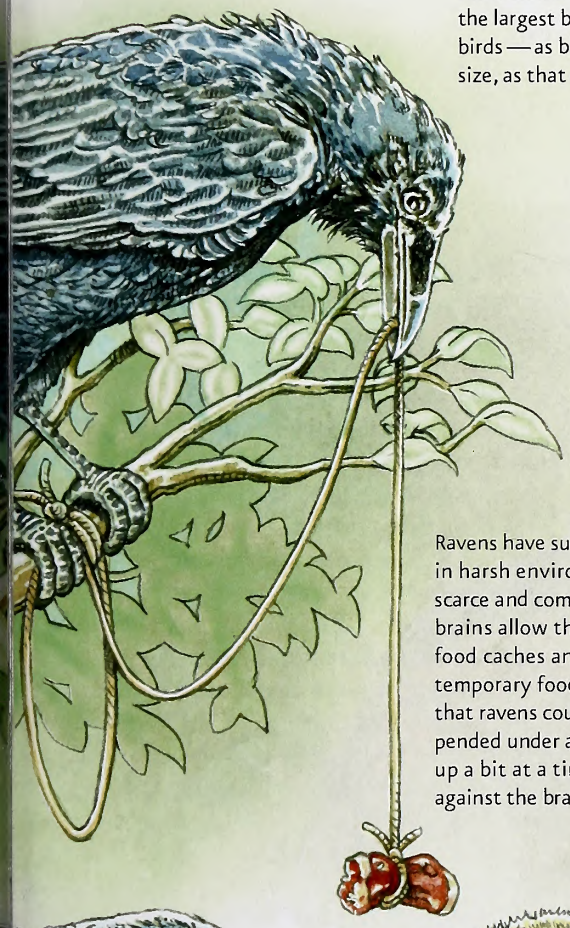
WHILE VERY FEW RAVENS SIT around quoting, "Nevermore!" one can be assured that, if such a skill increased the birds' ability to survive, they most assuredly would figure out how to speak. Ravens have been regarded as one of the most intelligent birds from the earliest of times. A number of adaptations and evolutionary pressures have produced this braininess.

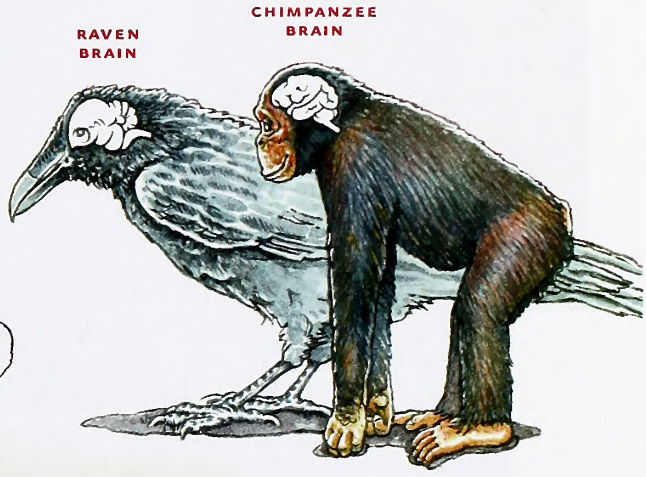
Bird brains are built radically differently from mammalian brains but do share some similarities. Ravens have amongst the largest brains, proportionately, of all birds — as big, in relation to their body size, as that of a chimpanzee.



22"– 27" long

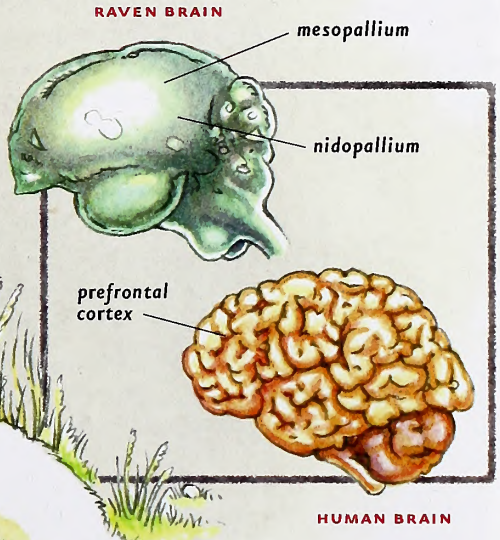
3'– 4' tall





Birds don't have a well-developed prefrontal cortex, the region of mammalian brains generally thought to be the seat of intelligence. But ravens do have proportionately the largest nidopallium and mesopallium (the regions of the bird brain which take care of higher thought) among birds.

Ravens have such smarts because they evolved in harsh environments where resources are scarce and competition is intense. Their large brains allow them to make tools, remember food caches and time the occurrence of rich, temporary food sources. One study showed that ravens could retrieve a piece of meat suspended under a branch on a string by pulling up a bit at a time and clamping the string against the branch.



Living with Coyotes

written by Jim Dean

On a hot day late this past fall, my son Scott and I were sitting on the porch of the cabin at the family farm in Granville County. We had planned to fish later, and Scott had brought his fiancée's Yorkie to hang out with us. Chewy was running around the yard, sniffing and exploring. He does not realize that he is very small, or perhaps even that he is a dog.

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Suddenly, we had company. Two coyotes loped quickly into the yard. Scott immediately jumped off the porch, and the coyotes began to run, hotly pursued by Chewy who either wanted to play or was defending his turf. A third coyote, unseen at first, stood in the edge of the field for a moment, then also ran away.

Perhaps those coyotes were simply passing through, but it's far more likely that they had targeted Chewy as a bite-sized meal. It was not the first time we'd seen coyotes on the farm. Ten years ago, I watched a pair searching for prey in a recently plowed field, and there have been many other fleeting encounters.

"Mark Twain once remarked that a coyote was 'a living, breathing allegory of Want.'"

Coyotes seldom attack humans, but are notoriously fond of cats and small dogs. Indeed, their appetites are so egalitarian that they eat insects, rodents, bird eggs, small farm animals, garbage and fruit — even skunks, porcupines and watermelons. Mark Twain once remarked that a coyote was "a living, breathing allegory of Want," a description that bass fisherman Bruce Chandler would certainly find appropriate.

Chandler was retrieving an artificial frog lure along the shore of an upper Mississippi River slough when a coyote leaped out of the tall grass and grabbed it. Chandler was able to reel his exhausted catch close enough to remove the hook with needle-nose pliers. "Lucky for both of us, the hook popped out," said Chandler, "and the coyote hitched a ride to the bank by hanging onto the trolling motor."

Coyotes are native throughout much of the American West, and while they have been expanding their range eastward in this century, the wide Mississippi River served as a natural barrier. Wildlife biologists, however, have long believed that coyotes would someday manage to cross the Big Muddy, and they weren't surprised when it happened. As early as the mid 1980s, I saw a road-killed coyote in east Tennessee. Coyotes often range widely — one tracked with a radio collar traveled from Alligator River National Wildlife Refuge Tyrrell County to Greensboro, and similar jaunts m not be unusual. In recent decades, coyotes have becon increasingly common in every eastern state, even inha iting many metropolitan areas. It hasn't helped that humans apparently accelerated this rapid colonizatio

About 30 years ago, there were rumors that coyot were being secretly imported and stocked in the easte Piedmont by a few hunters who were trying to aug ment the declining populations of native foxes the hunted with dogs. Those releases may not have beer widespread, but it was soon clear that North Carolir was not the only state where unauthorized coyote stocking was taking place. Efforts to stop the practic by federal and state wildlife agencies — with the sup port of legitimate sportsmen — proved difficult. Beside coyotes were already arriving from the West.

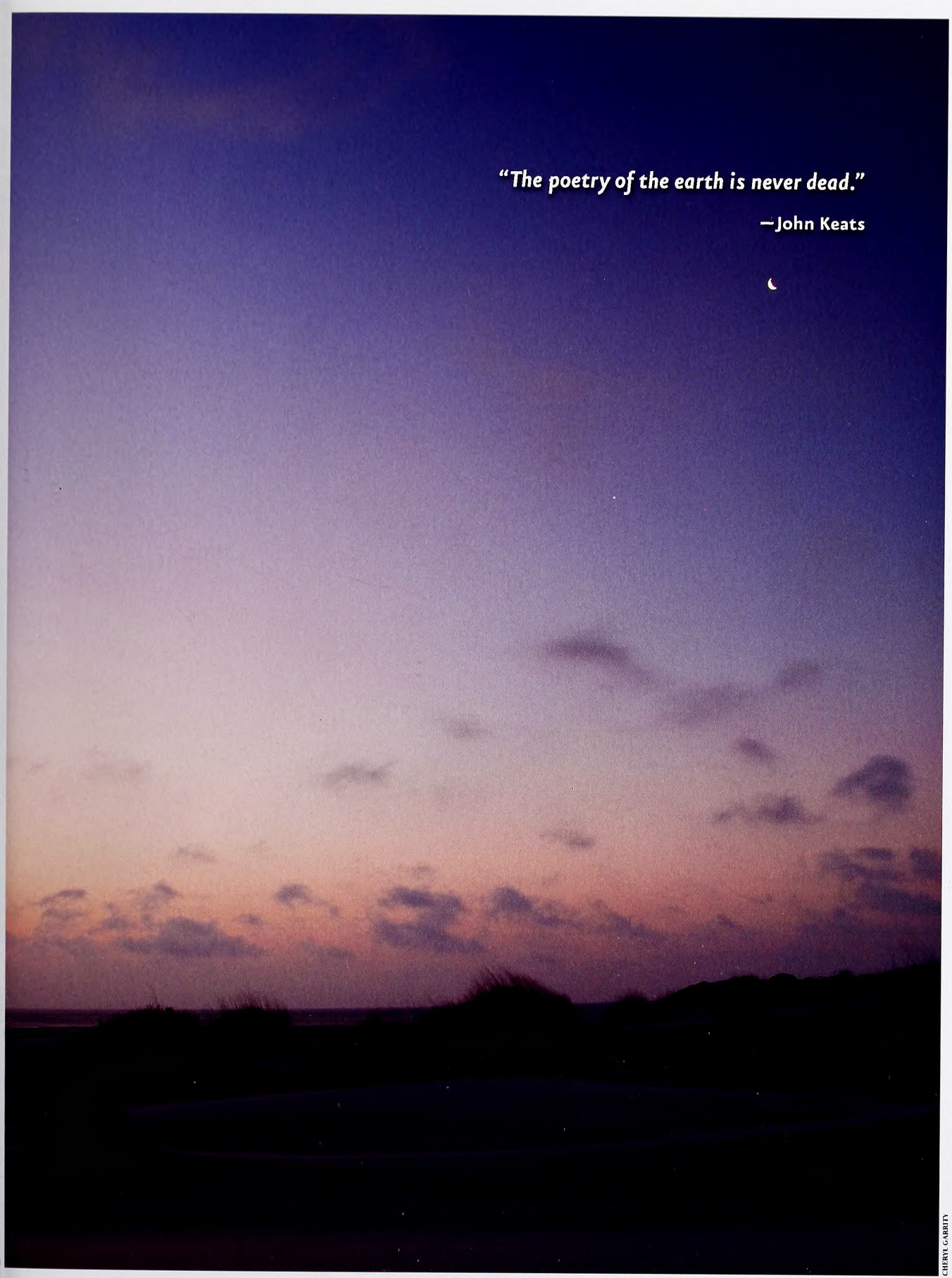
Some studies suggest that coyotes are no more fi icky about their mates than they are their food. Resear using DNA indicates that some coyotes have bred wit wolves and domestic dogs, yielding a hybrid that ma be even more adaptable than its pure-strain ancesto

John Deaton of Old North State Wildlife Control has been trapping coyotes in the Piedmont for abou five years. He uses soft-jawed traps to legally live-tra coyotes for resale to licensed fox pen operations whe the animals are released into large fenced areas and hunted with dogs. He trapped three coyotes on our farm — the same three? — but others will surely return, and any benefits to our other farm wildlife species will be fleeting at best.

Trapping may help control coyote populations, b any reduction in numbers is likely to be local and short term. Studies suggest that coyotes will typical repopulate favorable habitat within about six month to a year.

At this point, it is difficult to assess the long-term impacts of a flourishing coyote population. It is almo certain that they put additional pressure on many nati wildlife species, including game species such as rab bits, bobwhite quail and turkeys. And while coyotes may also remove some competing predators, it's doub ful that we can count that as a balancing asset. Coyot also take some young, old or otherwise vulnerable deer, but deer populations remain so high in North Carolina that any immediate threat seems unlikely.

What is clear is that coyotes are here, and we are going to have to live with them. As for Chewy, his happy, free-ranging days on the farm are over. Again a hungry coyote, being cute is no defense.



CHERYL GARRITY

OUTDOOR MOMENT

Pea Island National Wildlife Refuge

IN THE MARCH ISSUE

MIKE ZLOTNICKI

GOOD BOY

Boykin spaniels pack big retriever skills in a small, high-energy, versatile package.

TILL IT THUNDERS

Snapping turtles are roundly reviled (unless you like to eat them), but are fascinating, efficient predators.

PLANKS-A-PLENTY

Faced with the potential loss of its local pier, Oak Island did the only thing it could do — bought it.

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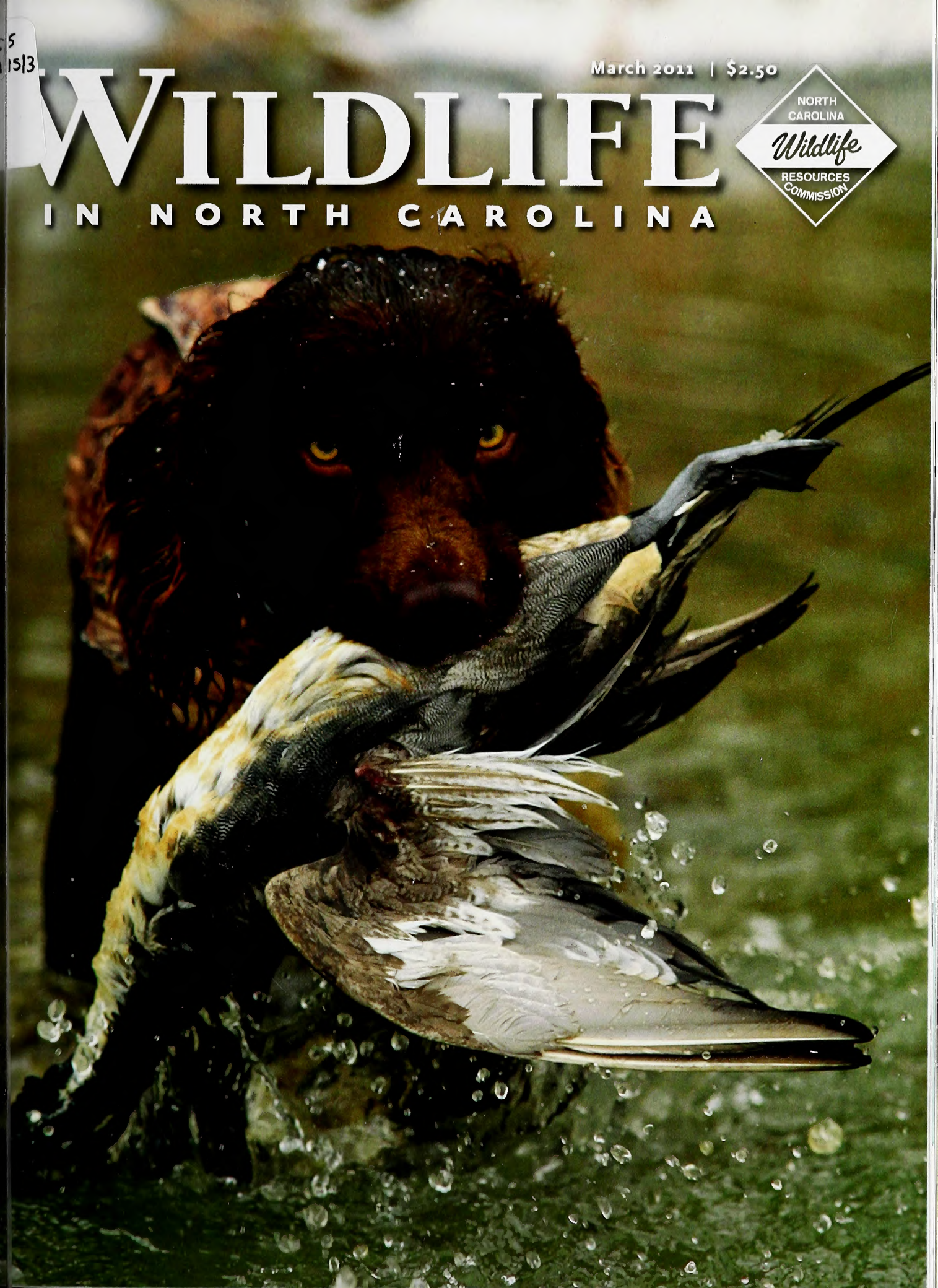
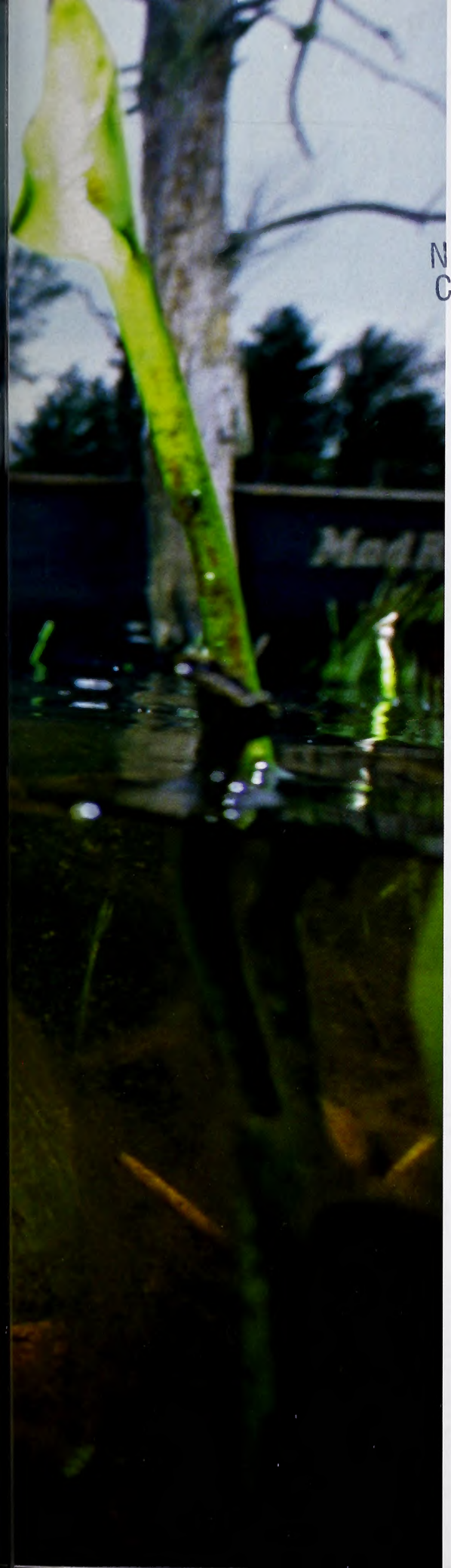


Snapping turtles lurk below the surface of most North Carolina ponds and lakes, but bite humans only on rare occasions when people get too close.

PHOTOGRAPH BY GEORGE GRALL.



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Cover: A Boykin spaniel can retrieve like a Labrador, but takes up only about as much space as a beagle. PHOTOGRAPH BY KEITH HENDRICKSON/NCWRC.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

Each day is filled with value judgments. What's more important—privacy or security? What's more useful—an old-growth forest or early successional growth? Which animals do we want around the most—charismatic megafauna such as deer and bears, or ecological indicator species such as salamanders and songbirds?

GUY FORTIER

At best, our value judgments are based on relevant context. At worst, they are based on capricious desires and preferences. Often, these judgments are simply our opinion—hopefully, an informed opinion.

We do this with wildlife all of the time. We dislike snapping turtles because they are ugly, scary and threatening ("Turtles with Attitudes," page 4), or we love them because they are fascinating predators. We cherish deer because they are docile, tame and pretty (or delicious, see "The Land's Bounty," page 10), or we despise them because they eat our plants and crash into our cars. We place value on songbirds because of their beauty and songs, or we dismiss them as little brown mice in trees. And let's not even broach the topic of so-called "trash fish" versus those given the honorific title "game fish."

Perhaps because of our enviable spot at the top of the food chain, we can toss about terms in the pejorative sense with abandon. A "predator" can mean an animal whose cunning and efficiency we admire, or a person to be despised for their indiscriminate victimization of other people. And as for a "parasite," well, we just hope to not have that label (or such a creature) attached to us.

We don't have to like certain animals or plants, but let's understand their role in the ecosystem before we decide their value. Context is always important—I don't necessarily want mice in my attic and spiders in my cupboard, but those creatures are welcome to make homes in my yard and surrounding woods.

It's likely that you are not the type of person who steers your car into a snake or a snapping turtle crossing the road. Good for you. But it's not always that simple, because the cultural context through which we view a creature sometimes clouds our judgment. The next time that you find yourself valuing one animal over another, stop and think about why you feel that way. If everyone put a little thought into such judgments, wouldn't wildlife be a little better off?

Greg Jenkins

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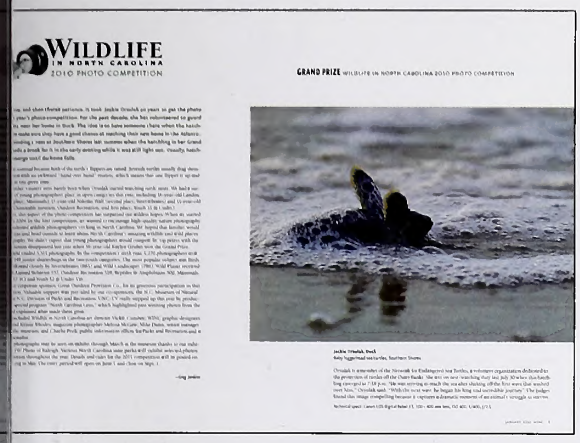
WILDLIFE IN NORTH CAROLINA
2010 PHOTO COMPETITION

GRAND PRIZE WILDLIFE IN NORTH CAROLINA 2010 PHOTO COMPETITION

Prison Walls

ook forward to the issue with the photographs (*WINC* 2010 Photo ion, Jan. 2011). However, this year I disappointed with some of the judges' do not believe photographs of captive mmals and other critters should be d in the same category as photographs he wild. As a hobby photographer, o way I can hope to compete with a ken of a great horned owl that will sit for hours on end and not fly away, or he zoo and wait for the captive sub- se. The photos you chose are won- d artistic; however, they should be in category.

Sharon G. Robertson
Linville Falls

your 2010 photo competition very I have a complaint I would like to make hen I read the name of your maga- h I have been taking for over 10 years, all the stories you have about crea- ll kinds running free in our waters, woodlands. It just doesn't seem right ged animals in the photo competition.

Larry Stovall
Martinsville, Va.

place picture in the plant category is y composed but the subject is class- rrectly. Mushrooms, members of the Fungi, are not plants. Mushrooms are external heterotrophs, possessing no photosynthetic capabilities due to a lack of chloroplasts. Plants are photosynthetic organisms, converting solar energy into chemical energy (carbohydrates), providing energy for themselves and the heterotrophic organisms of this world.

Wildlife in North Carolina is very informative and entertaining. I enjoy reading it each month. Especially enjoyable are the features Nature's Ways and Wild Notebook, as I use many of those articles in my high school biology classroom. Best wishes for 2011.

Lenora Lewis
Waleska, Ga.

***Greg Jenkins:** We have not had multiple complaints about photos of captive animals among the winners of previous competitions, but this is a valid point. While the difficulty of finding the animal is gone, it still takes skill and luck to compose and capture a great photo of a captive animal. We will think hard about these concerns over the next few months as we tweak our rules for the 2011 photo competition.*

We realize that mushrooms are not plants, but there isn't another category that fits them in the competition. Perhaps we should consider renaming the category "Wild Plants & Fungi," because we do get a lot of mushroom photos. For the record, the rules state clearly that fungi are welcome in the Wild Plants category.

Word Strong, Math Weak

I've heard of "new math," but this I have to question: With reference to "For Wildlife Only" in the Dec. 2010 issue, in the sidebar on page 6 and again in column 1 of page 7, is the statement, "According to the N.C. Department of Commerce, North Carolina's population is growing by almost 10 percent annually ..."

That means that in two years, we would have a 21 percent increase in the base amount. However, the U.S. Census Bureau states that North Carolina grew by 18.5 percent over the past 10 years. That would be about 1.7 percent annually. If we would have had a 10 percent annual growth, our population would be about 48 (instead of 9.54) million now.

Robert M. Fox
Concord

***Greg Jenkins:** Beware of journalists doing math, Robert. Seriously, we didn't do a good job on that one. We will be more careful in the future when publishing statistics, especially percentages.*

Doggone Good

Thank you for sharing Shari Smith's "Requiem for a Retriever" (Oct. 2010). She is a gifted writer and I look forward to more of her work. She has great insight into the special bond between people and dogs. Like many, I shed a tear or 10 for her Kate, and for the good working dogs I have known and loved. I especially appreciated her talk of the "dog men" who love to tell of the good ones. My daddy was a bird hunter and a true dog man, and I cherish the memory of his oft-repeated tales of old Dot, Jack, Rusty and their running mates.

Joel Strickland
Raleigh

We Want Your Feedback

Do you have a comment about content in *Wildlife in North Carolina?* Questions about something you read or have seen? Send us an e-mail at letters@ncwildlife.org. If you want fellow readers to know your opinion, this is the place. If you want an expert to answer your question, we will do our best to help.

Please remember that we also want to hear from you for our 75th anniversary issue in November. Send us your favorite memories from the magazine over the years, your suggestions for the future, and why you think the mag is still relevant. Send your e-mails to letters@ncwildlife.org with the subject line "75th Anniversary" or send regular mail to 75th Anniversary Letters at the address below. We will accept letters until July 1.

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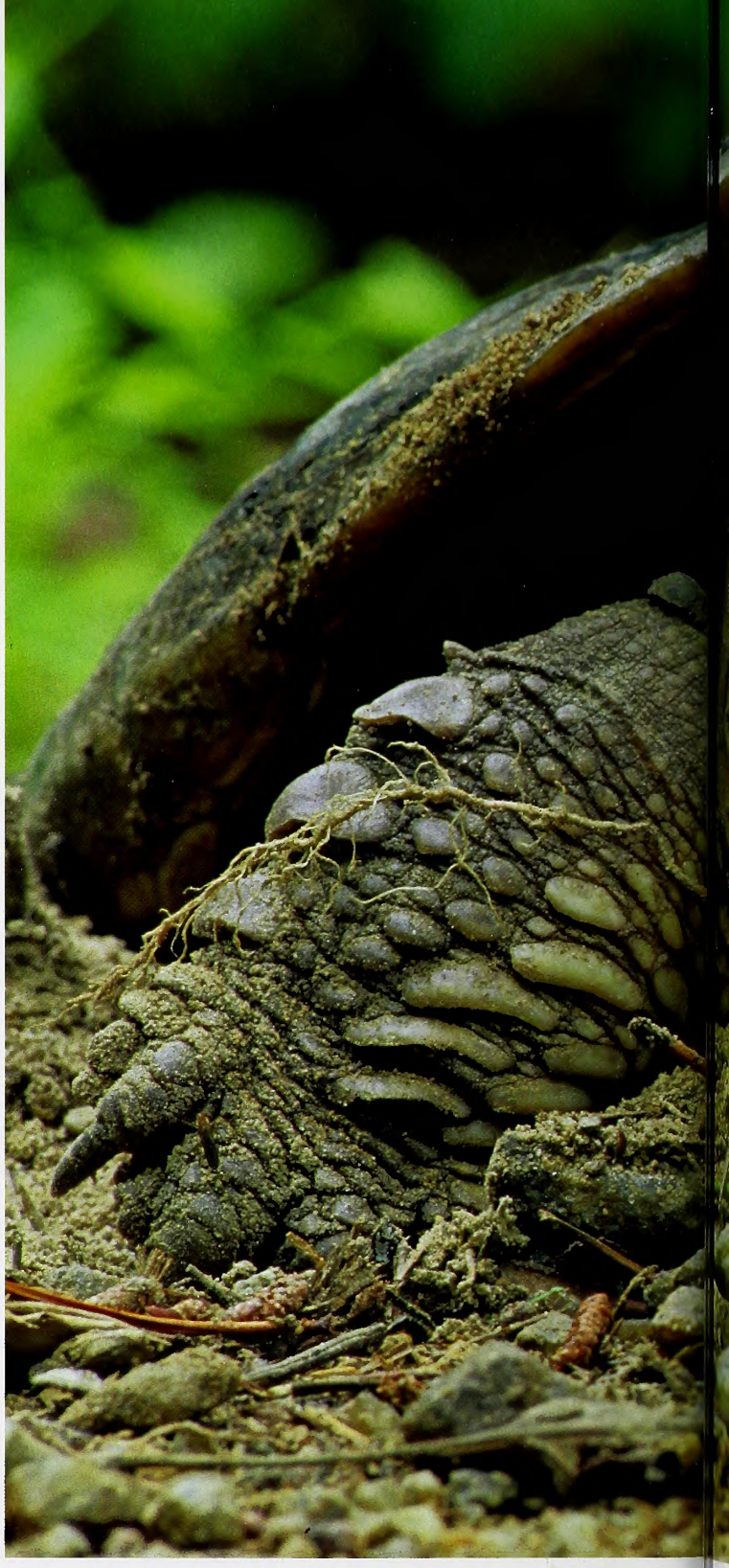
TURTLES WITH ATTITUDES



Ill-tempered, misunderstood and by most standards ugly, snapping turtles fill an important role in our aquatic communities.

WRITTEN BY DAVID S. LEE PHOTOGRAPHED BY GEORGE GRALL

The October 1927 issue of *Outdoor Life* ran an essay entitled "Turtle Zones and Ducks." It would be difficult to find an article that had more misinformation in a single page of text, but nonetheless, its premise is historically interesting. The storyline was that most native North American waterfowl nest north of the 40th parallel because their ducklings could not survive the hordes of hungry turtles that live in the latitudes to the south. The turtles were even blamed for keeping migratory ducks out of certain lakes during migration, and the author also accused the turtles of regularly raiding nests and eating eggs. Hunters wondered "why ducks will not use certain waters even when decoys are set in faultless array."

Above: Female snappers nest in late spring, depositing clutches of eggs in holes they dig with their hind feet. Hatchlings emerge from the nest after about six weeks, often digging to the surface as a group. Opposite page: When confronted on land, snappers are extremely defensive and will strike out and bite perceived enemies such as this curious canine.

It was, of course, the snapping turtle that got the blame for eating the "tender ducklings" and scaring waterfowl off various bodies of water. The writer went on to state "that less than 5% [of the ducks] grow from shell to maturity" in the waters inhabited by turtles. I was surprised he had not used the term "infested" to strengthen his point.

Up through most of the early 1900s people classified wildlife into one of two broad categories — good and bad. The "good" species were things one could eat, or animals that preyed on the "bad" creatures. Agencies used the terms "beneficial" and "injurious" wildlife, as this made the categories sound absolutely official. The "bad" animals were vermin that ate our crops, preyed on game species or killed our domestic animals. There were some conflicts within this system: Snakes that ate rodents were still "bad," yet rabbits and deer that ate our crops were nevertheless "good" because we could eat them. Snapping turtles, though edible, were vermin, because they were known to eat beneficial species such as hatchling ducks and game fish. And let's not forget that they snap and bite, and that couldn't be a good thing.

A 1928 typed manuscript I found in the files of the former U.S. Biological Survey put this into the context of the time. The report was titled "Data on the Snapper Crusade," and the first line read, "It has always been a source of speculation as to what good purpose some living things served, and the snapping turtle was one of these." One of the conclusions of this report was that skunks were actually beneficial after all because they ate turtle eggs and helped to keep the snapper populations in check. The negative opinion of snapping turtles even worked its way into the popular 1941 children's book "Make Way for Ducklings," by Robert McCloskey.

AN OBJECTIVE LOOK

I thought it would be interesting to take an objective look at the diets of snapping turtles as they were understood in the early 1900s, so I started to poke about. The U.S. Biological Survey (now the U.S. Fish and Wildlife Service) started tracking the food habits of snapping turtles. They examined untold numbers of turtle stomachs. As I looked through photocopies of a hundred or so original data cards from the 1920s and '30s, it became clear that snappers have a varied diet.

In addition to the expected, including frogs, crayfish, freshwater clams, aquatic insects and fish, there was a long list of pected food items — beavers, muskr grapes, freshwater sponges, acorns, blu spider egg cases, other turtles, salama frog eggs, toads and water snakes. On prise was a turtle with a stomach pack of 17-year cicadas, suggesting that the s came on land to catch them. The maj the stomachs contained bullheads, va species of crayfish and assorted plant rial — rhizomes of grasses, duckweed, cabbage and other wetland and aquat etation, dead leaves of deciduous tree mentous green algae, and various seed yes, there were a few ducks and other birds, but very few considering all the s content cards I looked through (one duck, one ruddy duck, one America and some feathers from a mallard).

Actually, these and similar investi conducted by the U.S. Biological Surv among the first to document the real various animals played in natural con ties. Prior to these efforts, most natural information was based on compilati anecdotal observations and serendi reports, a system that tended to doc isolated spectacular events, not the w mals typically made their day-to-day The ecological concepts of the interre ships of plant and animal communiti yet to be developed. Each living thin viewed simply in terms of its direct re ship to us. At the time the term *conse* was simply shorthand for "Let's figu how to locally maintain and produc game species."

Though the total list of snapping food items is long, when all the variou ies are compiled, it appears that fish, invertebrates and plant material mak bulk of the diet, with plants constit surprising 36 to 60 percent of the volu frequency. These turtles are also majo eaters, and I suspect a number of th food items catalogued from the stom snappers were ones scavenged by the Studies by the staff at the N.C. Muse Natural Sciences of the diets of North snappers showed similar food items sumed, but interestingly no remains c fowl were reported.

One of the most surprising recent a of snapping turtle feeding behavior report of numbers of adult turtles en from a pond at night and crawling 1 onto someone's front lawn to forage

l fallen to the ground. It was not just or two that did this; dozens of snap- re under the tree at any given time. would pursue others, trying to steal s from their mouths, and some waited ush at the water's edge to intercept ing individuals returning to the pond. e old female avoided all the chaos and remained under the tree eating the here she found them. Smaller turtles uble getting a good bite; the pears op out of their mouths and start lownhill, with the turtles in pursuit. rtles continued feeding after sunrise nd themselves competing with the uirrels for the pears. Stranger yet, a Iowa told me of watching with flash- s snappers fed at night. The turtles ork their way into daphnia blooms, uthfuls of the souplike daphnia-laden d then expel just the water back out their nearly closed jaws. The turtles every night for over a week until the bloom subsided.

AND DEMAND

v that you know a little more about s, here is the real story behind the one" and ducks. Yes, turtles eat duck- l occasionally capture adult ducks, dult birds are arguably sick or injured d keep in mind, largemouth bass are wn to eat ducklings, yet no one put the injurious wildlife list. There is a al line in North America above which very few turtles of any species. This se at more northern latitudes the hibernation period required for turtles does not allow them enough time to feed and grow in the summer, and the soil temperatures are too cool for successful egg incubation.

Many species of waterfowl migrate north of this line in the summer to nest and raise their young. The longer periods of daylight provide greater opportunity for feeding, allowing their young to grow and the ducks and geese to quickly build up needed fat reserves for migration. Yet keep in mind that mallards, black ducks, blue-winged teal, hooded mergansers and wood ducks all successfully nest and raise their young well into the "turtle zone," and in recent decades the expansion of nesting Canada geese and semi-domestic mallards in North Carolina attests to the fact that snapping turtles and nesting waterfowl can coexist.

So they bite, steal baits and fish off lines and from nets. And snappers are known to occasionally bite horses' noses and cows' tongues when livestock come to drink. If you have a duck farm or a fish hatchery, you don't want snapping turtles in your ponds. Nevertheless, snapping turtles are not Public Enemy No. 1. They are versatile predators and, as such, they are an important component of our aquatic systems. Predation has been shown to be a necessity for maintaining a balance in populations and for health and vigor of the prey species. Furthermore, snappers are efficient scavengers and play an important role in cleaning up dead and injured fish and ducks, which of course partly explains the villainous interpretation of data obtained from examination of stomach contents.

SNAPPING TURTLE FACTS

Scientific name: *Chelydra serpentina*

N.C. distribution: Statewide

Habitat: Nearly all permanent freshwater and brackish-water habitats

Length of shell: Adult females 8–14 inches, adult males 9–16 inches

Weight: 12–40 pounds

Record size for N.C.: 16.9 inches, 49.17 pounds

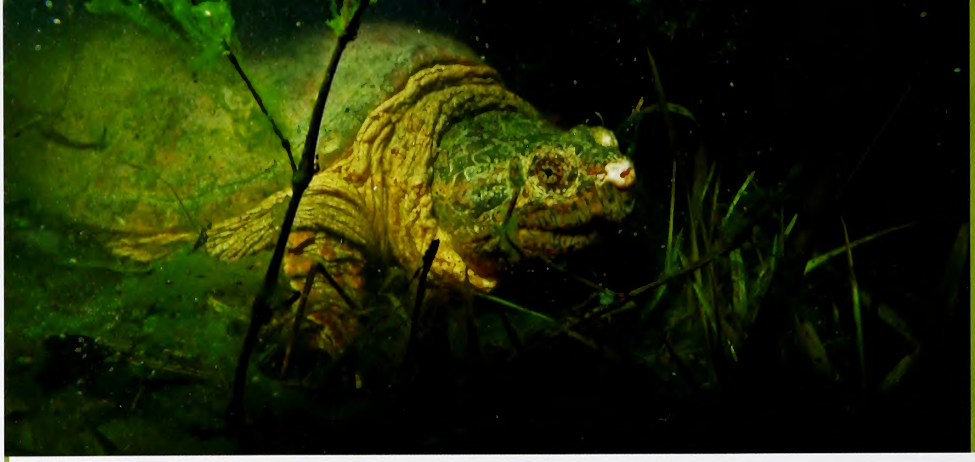
Record size for species: 19.5 inches, 75 pounds

Reproduction: Nest in early summer. Average clutch size about 25 eggs, but because females are long-lived, they may produce 500–1,000 eggs in a lifetime.

Age: Large adults average 30–40 years, but some individuals can live 50 years or more.

ALLIGATOR SNAPPERS

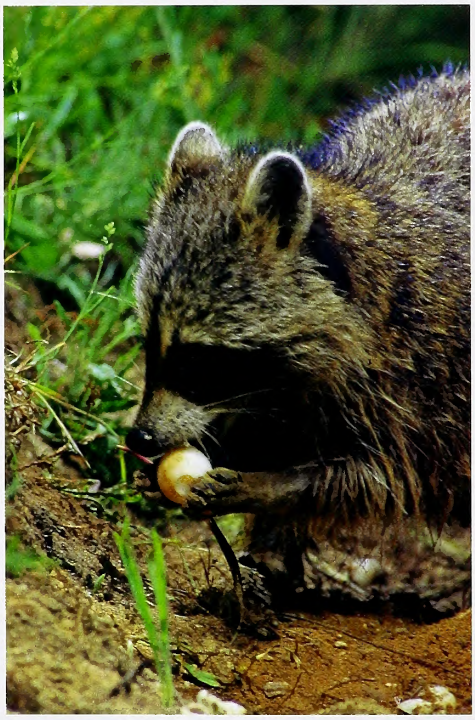
The alligator snapping turtle doesn't live in North Carolina. It is a different species that is confined to rivers flowing into the Gulf of Mexico. As the largest freshwater turtle in North America, the alligator snapper is considerably larger than our common snapping turtle, attaining a shell length of up to 31 ½ inches and weighing up to 250 pounds. Individuals can live 80 years or longer. The turtle's tongue features a small, reddish appendage that is wiggled as a lure. Fish, thinking it is a worm, swim to the turtle's open mouth and quickly become prey.

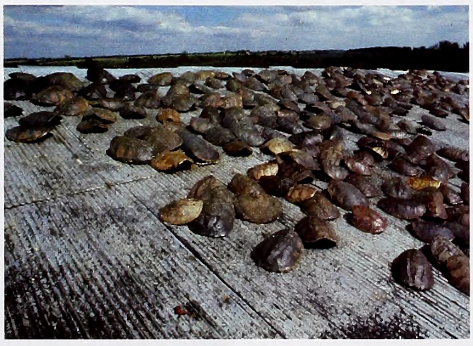


TYPES OF TURTLES

Snapping turtles are the single member
one of six families of turtles native to No
Carolina. Of the 300 or so species of turt
and tortoises in the world, only four a
true snapping turtles. They are confined
the New World with two of them living
North America, and two others occurin
Central America.

FAMILIES OF TURTLES NATIVE TO N.C.	NO. OF SPECIES IN N.C	NO. OF SPECIES IN NORTH AMERICA	NO. OF SPECIES IN THE W
SEA TURTLES	4	5	6
LEATHERBACK SEA TURTLES	1	1	1
SNAPPING TURTLES	**1**	**2**	**4**
MUD AND MASK TURTLES	4	10	24
N. AMERICAN POND TURTLES	10	32	48
SOFTSHELL TURTLES	1	3	30





Snapping turtles are simply doing their jobs, and because of their versatile appetites they contribute to the community on a number of levels. They are quite good at what they do.

It is actually surprising that snapping turtles were considered to be harmful species, as they once were widely consumed by people. Archeological research indicates that Americans fed on snapping turtles through much of the turtle's range. They were eaten in colonial America, and by the late 1800s there were major turtle butchering and distribution centers in various parts of the country. In the 1930s snapping turtles were bringing 10 cents a pound; and today they are going for 60 to 80 cents a pound live weight—perhaps, considering inflation, one of the few foods to go down in price over the decades. The commercial harvest of snapping turtles remains a big business in areas of the Midwest, but many states now control their harvest, with seasons, size limits, quotas and outright bans. In North Carolina licensed turtle collectors are allowed only 10 turtles a day and 100 per year.

With different states having different wildlife regulations, turtles caught in one state are often sold out of an adjacent state in order to mask their true origin. Last year a massive investigation involving undercover work in nine eastern states and one Canadian province documented the illegal sales of large numbers of protected reptiles and amphibians. Many of these violations involved snapping turtles. Thousands of snapping turtles were laundered through a Louisiana turtle farm and shipped illegally to China, where ther increasing demand for turtle meat. C snappers went to a meat processing pl Maryland. In addition to violations o and federal laws, there were also violat the Lacey Act, as the snapper sales repre illegal interstate commerce. Altogethe illegal trafficking in turtles resulted i felony charges, 11 misdemeanors and of violations. It would appear that the arisen quite a demand for our worth injurious wildlife.

HUMAN AND REPTILE ADAPTA

The rich fossil history of snapping tu shows that the very species that we fi North Carolina farm ponds today was spread in prehistoric times. The earliest that have been found date back 5 to 9 years, and the fossil record shows that forms of snappers lived as far back as lion years ago. They are a primitive fo turtle, but the species' design was su change was unnecessary, even in our evolving world. Both the current and shells of snapping turtles are quite dif from those of other aquatic species. T lighter in weight, and the lower part shell is less complete, leaving the legs a of the tail totally exposed, even when t tle tries to retreat into its shell. Althou provides less protection, it allows the much more leg mobility, enhancing

How Do Slow Snapping Turtles Catch Swift Fish? See Nature's Ways, page 39.

ing and the turtle's ability to travel over land.

r long-term success probably lies more adaptability than in actual body Snapping turtles are able to remain e-covered waters for extended periods breathing in air from the surface dur- rnation. Like other turtles, snappers able of extracting dissolved oxygen e water through special membranes in roats and cloacas. They are extremely at this, and unlike many of the other uatic turtles, they are capable of hiber- n swamps and marshes and other sites ne dissolved oxygen levels remain low. of this, snappers can survive farther an many species of turtles and exploit unavailable to others.

to their size, snappers are able to pro- o to 10 times as many eggs per season ther freshwater turtles. Typical clutch bout 25 eggs, and in the Deep South males may lay more than one clutch . Snappers also grow faster than most rtles. Because of this combination of heir populations are less likely to col- e to nest predation, road mortality er issues that are detrimental to our rtles. Furthermore, young snappers ne prehensile use of their tails, helping hem in place in currents, and the long as a counterbalance and provide y, allowing floating turtles to poke s above the surface with less expen- f effort. Let's not overlook the tail's as a rudder and its possible use for on through the water. And talk about your breath, though they don't typi- this, laboratory studies of non-hiber- nappers in 50-degree water showed can survive submersion for over 14 d to this their temperament. There is they are named snapping turtles, and r long flexible necks they are capable nakelike defensive strikes. These are pted creatures with an opportunistic l that helps understand their 9- year success story.

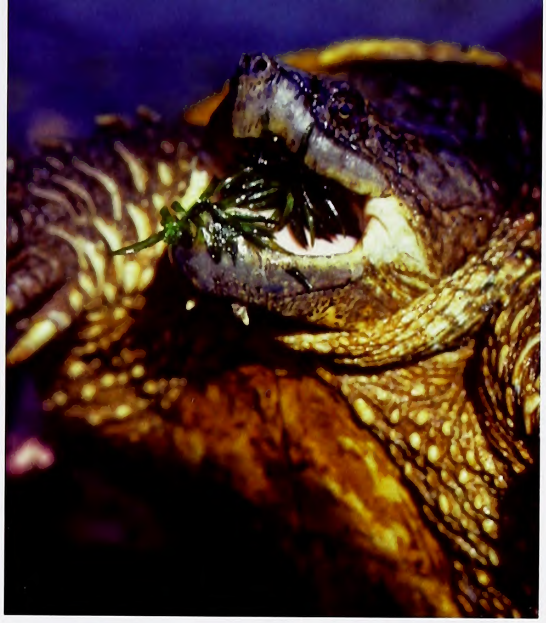
ttitudes have changed considerably early 1900s. The quote provided ear- ot unique. In my files are numerous ticles that were written between 1916 as editorials, and they appeared regu- ewspapers, popular outdoor hunting and fishing magazines with names such as *Fins, Feathers, Fur*, and even in the professional game association bulletins of the time. The article in *Outdoor Life* that I cited at the beginning of this story ends with the thought "It may be possible some day to rid the country of turtles, but there is no remedy in sight now, in fact turtles very likely are increasing in numbers." So, by and large, it is refreshing to see how far we have advanced in our understanding of the natural world. Despite the concerns loudly expressed 60 to 90 years ago, I don't think we need to be too worried about global warming allowing turtles to expand their range further north in the future, eliminating ducks from the face of the earth.

Although many people still consider snappers vermin, fortunately today not everyone sees them that way. Last summer I came across a lady helping one to cross a highway safely. Her husband directed traffic while two children stood by her car as she prodded the back end of the large turtle with a rolled-up newspaper, encouraging it to move off the road. An approaching driver quickly positioned his pickup to help block one lane of oncoming cars. The turtle was confused. Traffic was a little backed up, but no one seemed to mind. A number of drivers gave thumbs-up signs as they edged past the commotion.

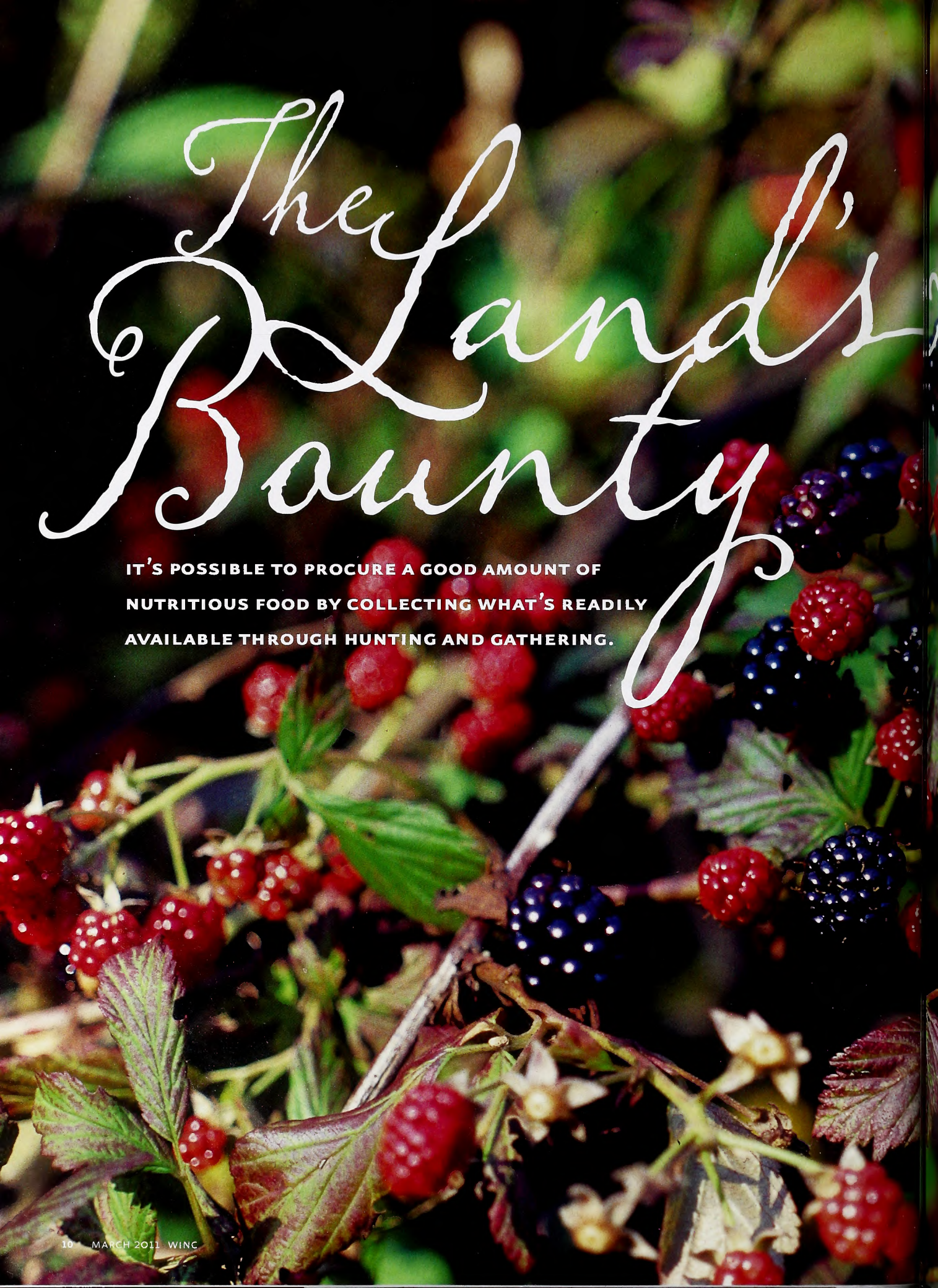
Once the snapper was safely on the shoulder of the road and could see the swamp was only 30 to 40 feet away, it started moving faster. With its neck fully extended, and the shell and long tail held high off the ground, the turtle quickly reached the water's edge. The joyful children high-fived and giggled as their parents herded them back into their car. Horns beeped in recognition of a job well done. Young faces pressed against back windows in attempts to get a glimpse of the turtle as the line of vehicles passed by. The female snapper, apparently having successfully completed her nesting chores, was back home, safe from the asphalt's inherent dangers for at least another year.

Good people; happy and content turtles. A half-century of wildlife public relations is paying off. The so-called vermin now at least have our respect.

Longtime WINC *contributor David S. Lee is director of the Tortoise Reserve, an international turtle conservation organization.*



Opposite page: Predator predation on snapper nests is high, and typically the entire clutch is consumed once the nests are found. Humans are another predator of snappers (empty shells spread out on a dock), capturing them for food or accidentally killing them on the road (above). Top two photos: With strong jaws and a large, gaping mouth, the bite of an adult snapping turtle is something best to avoid. The snapper's long, flexible neck is useful when striking. It also allows them to easily flip over when overturned.



The Land's Bounty

IT'S POSSIBLE TO PROCURE A GOOD AMOUNT OF NUTRITIOUS FOOD BY COLLECTING WHAT'S READILY AVAILABLE THROUGH HUNTING AND GATHERING.

WRITTEN BY BRUCE INGRAM

This afternoon my wife, Elaine, was baking a wild blackberry pie for dinner, and I had just taken a venison roast from a Crock-Pot. We gathered the blackberries the July before, and the previous September I bow-killed the mature doe from which the venison came.

In prehistoric times, my spouse and I might have been called hunter-gatherers, a term anthropologists use to describe the lifestyle of humans before the advent of agriculture some 8,000 years ago. Those *Homo sapiens* foraged for fruits, nuts and berries and hunted with such primitive weapons as the bow and arrow, harpoon and atlatl.

Obviously, I don't go afield with a harpoon or an atlatl. And, of course, Elaine and I still venture forth to the local supermarket, but almost all of our meat comes from what I kill or catch. (I haven't eaten pork in some 35 years and beef in some 20, and only free-range chickens and wild turkeys the past decade or so.) A large percentage of our fruits, berries and nuts comes from what we gather afield. We supplement those foods with produce from our organic garden and cherry and apple trees. With the purchase of additional fruits and vegetables from farmer's markets and, yes, the grocery store, we do just fine.

Besides saving a great deal of money by eating this way, we get numerous health benefits. When in the fall of 2008 Elaine was diagnosed with breast cancer, she hired a nutritionist who encouraged her to consume more wild game, fruits, nuts, berries and organic foods. That advice prompted Elaine to switch to my diet. I sometimes tease her that we paid someone $200 to tell her to eat like I do — or like our primitive ancestors did.

Here's how you too can become a hunter-gatherer.

MELISSA McGAW / NCWRC

MELISSA McGAW / NCWRC

The distinctive look of the shagbark hickory signals the presence of a potential food source in the forest, while wild grapes can also be found in forested and clear-cut areas in the summer.

The Hunter Part

This past season while hunting in North Carolina, Tennessee and the two Virginias, I totaled 10 deer, three turkeys and a number of small-game critters. Before the next season commences, our family will easily consume all of this meat.

Given North Carolina's abundant deer herd in most areas of the state, venison is the most available wild game meat and is a true health food. It's a superior source of protein, low in fats (especially the harmful saturated kind), and a fine source of iron, vitamin B12, niacin, riboflavin and vitamin B6. Additionally, venison is low in calories, especially when compared to other red meats such as pork and beef. Venison even offers special nutritional benefits to pregnant or lactating women and for growing children (check out the World's Healthiest Foods website: www.whfoods.org).

Lower in fat than their domestic counterparts, wild turkeys also lack the hormones and antibiotics that have been injected into the tame versions, which, in today's factory farm era, often spend their lives in small enclosures going from poults to massive, big-breasted creatures in a few months. Try a grilled wild turkey breast and compare its moist, delicate flavor with the bland white meat of a factory-farmed bird. And for a culinary treat, try wild turkey-leg soup. Squirrels, rabbits, grouse and doves also grace our table from time to time, and each offers its own distinctive flavor. Try squirrels and rabbits in casseroles; grouse simmered in a slow cooker with carrots, potatoes and onions; and dove breasts microwaved and served with brown rice. (See Elaine's recipes in the accompanying sidebar on page 15.)

The Gatherer Part

The Tar Heel State hosts an incredible array of wild fruits, berries and nuts. In order of harvest, here are some of the main ones, plus when they ripen and where they grow.

Strawberries ripen in mid- to late May in much of the state, usually doing so about the time the spring gobbler season concludes. Wild strawberries are smaller and sweeter than their store-bought versions and typically grow along field edges and early successional areas. Turkeys, towhees, robins and numerous other species of avians and mammals relish wild strawberries, and I have never found enough to make a pie. Li cultivated strawberries, the wild ones not freeze well, so given their scarcity best option is often to pick enough for morning cereal.

Understandably, wildlife biologists about the threats of nonnative plants su Asia's wineberry. But this species is not to disappear from the state, so why not its fruits? Wineberry and its relative the berry both ripen in late June to early and July, and like another relative, the black thrive on disturbed ground. Wineberrie raspberries feature much milder, sweeter than their sour-tasting relative.

Wineberries tend to grow in great p sion in some areas and not be present in other seemingly similar, suitable lo It is often a struggle for me to pick a q but when I do, they invariably end up pie, either the same day or the next wi

Raspberries are a real thrill to find, a seem to suffer in their millennia-long b to outcompete the blackberry. Often gather only enough raspberries to put i meal or cold cereal. Sometimes during rare few days when the last of the raspb and wineberries are coming in and the of the blackberries have started to rip Elaine and I will pick all three for her Berry Cobbler.

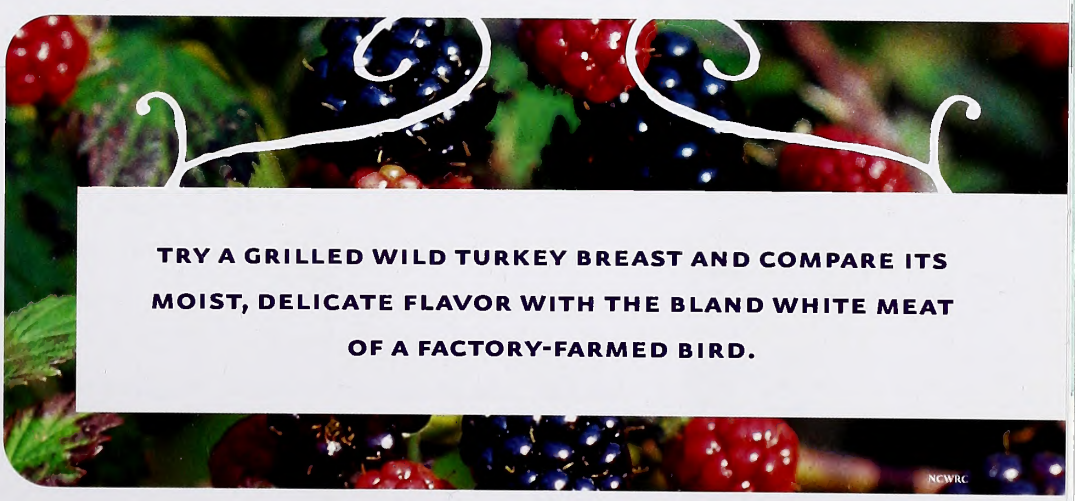
Of all wild berry crops, blackberrie the most common in the state. Many ti have picked a half gallon to a gallon at a Given this abundance, they are the berry likely to end up in jams and jellies, as w the requisite pies and cobblers. In the few years Elaine has begun concocting b berry waffles and pancakes. We find th ness that they bring to these breakfast e so appealing that we add only butter in of syrup, so as not to mask the tangy ta

Besides thriving in early succession areas, blackberries often grow along the rivers. Many times from mid-July to m late August, I have come across blackb flourishing along the South Fork of the River and the main stem New itself. Inva I ask my canoe mate if we can paddle and pick a few. Doing so will give us ou dose of vitamin C, as all of these wild b (wineberries, raspberries and blackb are members of the *Rubus* genus) are in that essential nutrient.

PHOTOS BY BRUCE INGRAM

Clockwise from top left: Wild turkey is a superior substitute for domestic turkey, while venison is low in fat and rich in protein and iron. The cottontail rabbit is common throughout the state and makes for delicious stews and casseroles. Persimmons ripen in the autumn and are a much-loved wild food.

: September, summer grapes (perhaps
. common variety in the state) begin
Without a doubt, the best jelly I have
:n has come from summer grapes.
/ flaunts a tantalizing zing to it and
ıerworldly delights when served with
de whole wheat bread hot from the
apes thrive in regenerating clear-cuts
s in second-growth forests.
black walnuts begin to ripen in late
er and continue doing so well into
Elaine and I have to race the foxes
squirrels to these nuts, but there
:ems to be enough for everyone.
are a chore to harvest: You have to



TRY A GRILLED WILD TURKEY BREAST AND COMPARE ITS MOIST, DELICATE FLAVOR WITH THE BLAND WHITE MEAT OF A FACTORY-FARMED BIRD.

NCWRC

Start Them Young

When our children Sarah and Mark were able to walk, we started having them accompany us on our fruit- and nut-gathering expeditions. Doing so is a marvelous way for young folks to learn more about the wild world, as there's just something naturally fun and entertaining about finding then picking something to take home to eat.

These outings are also a superb time to teach children about which animals consume which wild foods and the interrelatedness of flora and fauna. And if your kids want to sample a few nuts or berries while afield, let them.

Identification

A quality field guide will add immeasurably to your food gathering expeditions. My favorite is the "National Audubon Society Field Guide to North American Trees: Eastern Region." In this tome, you'll learn that the shagbark hickory's namesake gray bark features narrow, long strips, plus 8- to 14-inch pinnate leaves that typically have five leaflets. The round, green nuts are large, sometimes as much as 2 ½ inches long.

The mockernut hickory is characterized by similar leaves, except they feature seven to nine leaflets, and the gray bark is irregularly furrowed. The nut is 1 ½ to 2 inches long, and the thick husk often splits to the middle. Both shagbarks and mockernuts thrive throughout most of North Carolina. For more information: www.randomhouse.com/audubon, 1-800-733-3000.

For fruit and nut identification, Acorn Naturalists offers two books: "Eastern Berries" (ages 12 and up) and the "Take-Along Guide to Berries, Nuts and Seeds" (ages 6 to 12). For more information: www.acornnaturalists.com, 1-800-452-2802.

remove a green outer husk and the shel
remove the nutmeat from the inner san
of the shell. The best approach is to re
just the husk and allow the shell and it
tents to mellow for a month or so. Be s
wear old gloves when dispatching the
because it will stain everything it come
contact with.

Black walnuts and hickory nuts are
marvelous health foods. They are chole
free, high in the good fats (polyunsatu
and monounsaturated) and low in the
one (saturated). These nuts also contai
protein, minerals, fiber and healthy o
fatty acids. One of the buzzwords in h
circles today is *flavonoids*, which are be
to cardiovascular health, and walnut
hickory nuts also feature them.

Numerous hickory species exist in
Carolina, but two particularly stand
their flavorful nutmeats: the mockern
shagbark. The mockernut is the first to
usually doing so in early September, a
shagbark begins to mature in late Sept
Interestingly, shagbark nuts will often
on trees until well into December. On o
all-day December hunt, for example,
eaten all the food in my daypack and
ravenously hungry when I came to a sh
hickory grove. I gathered a number of
cracked them open with a large ston
primitive hunter-gatherer tool for sure
for five minutes dined on the hearty nut
I continued on refreshed and ready to h
rest of the day.

Persimmons are the last major fr
ripen, usually after several October
But I have picked them as late as mi
December, and some remain on trees
early January. Persimmons are high in
C and exude a piquant fruitiness that is
that of any other wild or domestic fru

Some folks relish persimmon jelly
Elaine's and my favorite way to eat the
bread that also includes walnuts and/
ory nuts. No other domestic or wild n
zing to bread like wild black walnuts

One of the great pleasures in Elain
my life is living off the proverbial fat
land. You too can become a hunter-g

Bruce Ingram is a regular contributor to
in North Carolina *magazine. Contact*
be_ingram@juno.com.

NCWRC

Elaine's Wild Food Recipes

Venison Roast

Marinate a venison roast, ideally for 24 hours, in a mixture of the following:

¼ cup olive oil
½ cup red wine vinegar
½ cup red wine
1 teaspoon soy sauce
1–2 teaspoons prepared mustard
2 crushed garlic cloves
3–4 onion slices
Salt and pepper to taste

After combining the above ingredients, add water or vegetable broth to make enough liquid to cover the roast while marinating.

Place the roast and the marinade in an ovenproof dish with a lid. Bake at 350 degrees for 3 to 4 hours, until tender. Add liquid as necessary to keep the roast from cooking dry.

Squirrel and/or Rabbit Oven Casserole

Place cleaned squirrel or rabbit parts in an ovenproof casserole dish. Around the meat, place diced carrots and potatoes, sliced celery, onion cubes and/or mushroom pieces. Quantities will vary depending upon the amount of game.

Combine one can of cream of mushroom soup with ⅔ can water. Pour over the vegetables and rabbit/squirrel.

Cover. Bake at 350 degrees for 2½ hours, until tender. Serve as is or over rice.

Persimmon Nut Bread

⅓ cup butter
½ cup sugar
2 eggs
1¾ cups all-purpose flour
2 teaspoons baking powder
½ teaspoon salt
¼ teaspoon baking soda
1 cup mashed ripe persimmons with seeds removed
¼ cup chopped black walnuts or hickory nuts

Cream the butter. Add the sugar and eggs. Beat well. Sift the dry ingredients together, then add to the creamed mixture, alternating with the mashed persimmons. Stir in the nuts.

Pour into a greased loaf pan and bake at 350 degrees for 1 hour.

Wild Turkey Leg Soup

2 cups cooked, diced turkey legs (pressure-cook the legs until the meat falls from the bones)

3 medium potatoes, peeled and cubed
1 turnip, peeled and cubed
2 carrots, peeled and diced
4 celery stalks, diced
Other mixed vegetables as desired
2 quarts chicken or turkey broth
6 tablespoons butter or margarine
1 onion, chopped
6 tablespoons all-purpose flour
Salt and pepper to taste

Place the cut-up potatoes, turnip, carrots and celery in the broth. Bring to a boil. Reduce the heat and cook until vegetables are tender, about 20 minutes. Drain, reserving the liquid and setting the vegetables aside. In the same kettle melt the butter and sauté the onion until tender. Stir in flour. Gradually add 1½ cups of the reserved broth, stirring constantly until thickened. Gently stir in cooked vegetables and diced turkey. Add the remaining reserved liquid, a cup at a time, until the soup is the desired consistency. Peas, lima beans, corn, cabbage or other vegetables on hand may be added as well. Yields 8 to 10 servings.

Berry Cobbler

1 quart fresh berries
1 cup sugar
1 cup all-purpose flour
2 teaspoons baking powder
Pinch of salt
1 cup milk
1 stick (½ cup) butter

Rinse and drain the berries and place them in a bowl with ⅔ to 1 cup sugar.

In a second bowl combine the flour, baking powder and salt and stir to mix. Then stir in the milk, forming a batter.

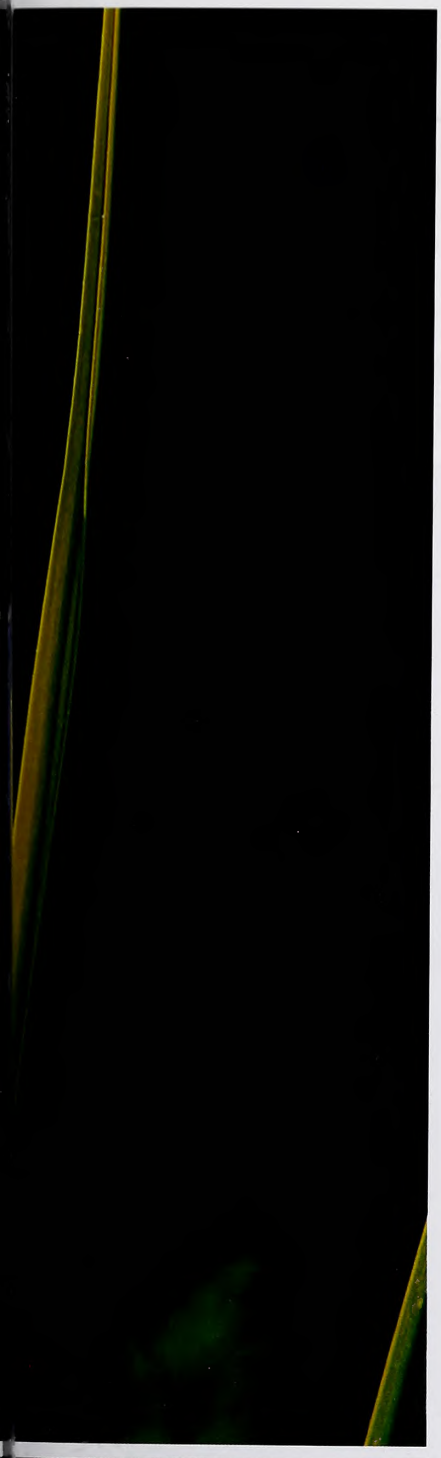
In a rectangular baking dish (I use a 2½-quart glass casserole) melt the butter. Pour the batter over the melted butter. Spoon the sugared berries over top of the batter.

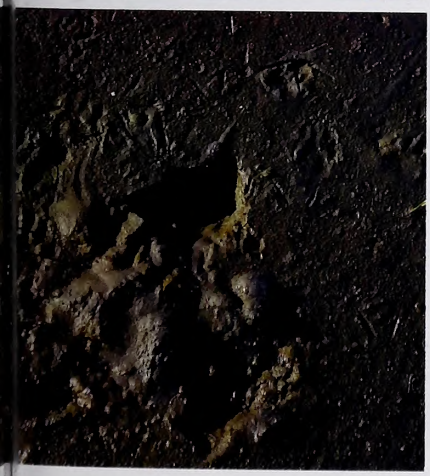
Bake at 350 degrees for 35 to 40 minutes, until lightly golden on top and no longer doughy in the center. Serve as is or with ice cream, yogurt or whipped cream on top.

Signs of Passage

Reading animal signs is a fascinating year-round outdoor activity for naturalists of all ages.

Written and photographed by Jack Dermid





From a photography blind, I watched a wild turkey enter the cornfield. I knew he was leaving footprints in the sand between the rows. As the turkey came closer, I noticed a loose feather and wondered how far he would travel before the feather fell, leaving another sign of his passage.

I am an outdoor wanderer. On many outings, I do not encounter wildlife but know that many species live in my surroundings, perhaps watching me at any moment. I have found turkey tracks and feathers far more often than I have seen the birds.

Wild species leave many signs as they carry out their daily lives. These signs include tracks, tooth and claw marks, dens, nests, hair and fur, droppings, feeding signs and more. The early naturalist Ernest Thompson Seton referred to animal signs as the "oldest of all writing." He was a master at reading and interpreting them.

It's easy to identify the distinct footprints of a raccoon or the felled tree of a beaver. But many animal signs are not so easy to recognize. Follow me through several environments to look for animal signs:

An egret flushed as I stepped into the tidal creek. The tide was low and the egret left footprints on a sandbar. Had I not seen the egret, I would have noted its passage by the feather left behind in a tussock of cordgrass. Bird tracks often require additional clues to identify the species. Ahead on an exposed mudflat was a hole where a raccoon had dug for a clam. The coon's footprints told the story.

Upstream along the edge of the run were perfect opossum tracks in the moist sand. The print of the front and the hind foot were side by side, clearly showing the opposable thumb of the hind foot. The opossum left its signature.

Beyond the effect of the tide, the creek was fresh as it passed through a bottomland. On the bank, a patch of sedges had been browsed by a deer. Deer do not have upper incisor teeth, so bites of vegetation show discernible tearing. Nearby an herb had been grazed by rabbits. The stems had been cleanly cut by matching upper and lower incisors.

Crossing the bottomland to higher land, I came across the shed skin of a rattlesnake. The size of the skin, the small scales of the head and faint markings provided clues. At the base of a pine, a pile of cores and scales revealed the feeding place of a squirrel. A rabbit marked its passage in a nearby field with its characteristic pile of pellets. A bleached skull marked where an opossum died. An opossum skull can be easily identified by the very small brain case, the smallest for its size of any North Carolina mammal.

Walking farther, I discovered the nest of a squirrel high in an oak, a bear track in a sandy spot, and the shed antler of a deer with rodent tooth marks. Antlers provide valuable minerals to many smaller animals.

Another day and place: I came across footprints of two distinct species in a muddy area. The prints showed the characteristics of the dog and cat families—claw marks on the dog track and a lack of claw marks on the cat print. The dog footprint looked somewhat atypical, so I checked it more closely. The size and shape of the track, with the parallel position of the toe bones, indicated that the dog track was made by a coyote. Toe prints of a domestic dog are more spread apart. I was not sure of the identity of the cat footprint.

The identification of animal signs is not always easy and may require detective work. Even then, uncertainty and mistakes are often part of the game. Signs may be fragmented, atypical or similar to other species.

Repeated experience makes identification easier. There are a number of field guides and books about reading animal signs. These are important aids for both the beginner and the veteran. ◆

Jack Dermid is a retired biology professor at UNC Wilmington and a former staff photographer at WINC.

This page, clockwise from top left: A timber rattlesnake's shed skin, an opossum skull, dog and cat tracks and a beaver-felled tree.

Previous page: A feather marks an egret's path through cordgrass. Opossum tracks are identifiable by the opposable thumb. Rabbits leave clean edges when they graze vegetation. Raccoons leave telltale footprints.

Top photos: When deer browse vegetation, they leave obvious signs of tearing. Gray squirrels practically advertise their presence with their large, leaf-constructed nests. Bottom photos: small mammals chew shed deer antlers for the calcium and to sharpen their teeth. Black bear prints are easy to spot in sandy soil. Squirrels leave nothing but the center of a pine cone after feeding.

Preserving Fishing TRADITION

Oak Island's purchase of the former Yaupon Pier keeps tradition alive and public access to saltwater fishing available.

WRITTEN BY **MIKE MARSH** PHOTOGRAPHY BY **NICK NOBLE**

Being among a crowd of anglers and sightseers at one of North Carolina's storied ocean fishing piers makes the thought of being the last one to walk the planks seem surreal. But the feeling of waking up from such a nightmare into a dreamlike reality is exactly how Robert Turner perceived the grand opening of Oak Island Pier.

After the loss of Long Beach Pier in 2006, Oak Island was left with only two remaining piers. Then, in what apparently was going to become a domino effect, it was announced that Yaupon Pier also would close.

"I was the last person to fish at Long Beach Pier," Turner said. "I live on Oak Island, and losing that pier felt worse than losing my best friend. It was just devastating. I was born in 1962 and had fished on Long Beach Pier since I was eight years old."

It appeared that saving Yaupon Pier—one of just 18 North Carolina fishing piers remaining in business, out of a historic high of 36—was another lost cause. But the Town of Oak Island stepped in to buy the pier, thanks to the support and cheers of residents like Turner, as well as many out-of-towners.

The road to public ownership of the pier was a struggle, fraught with many stumbling blocks, which included opposition by some residents who opposed the town's purchase of the pier along with its adjoining tackle shop and restaurant. But there were no non-supporters evident in the crowd gathered at the grand opening ceremony and celebration held at the pier on Saturday, May 16, 2009. Former Oak Island mayor John Vereen III cut the ceremonial ribbon.

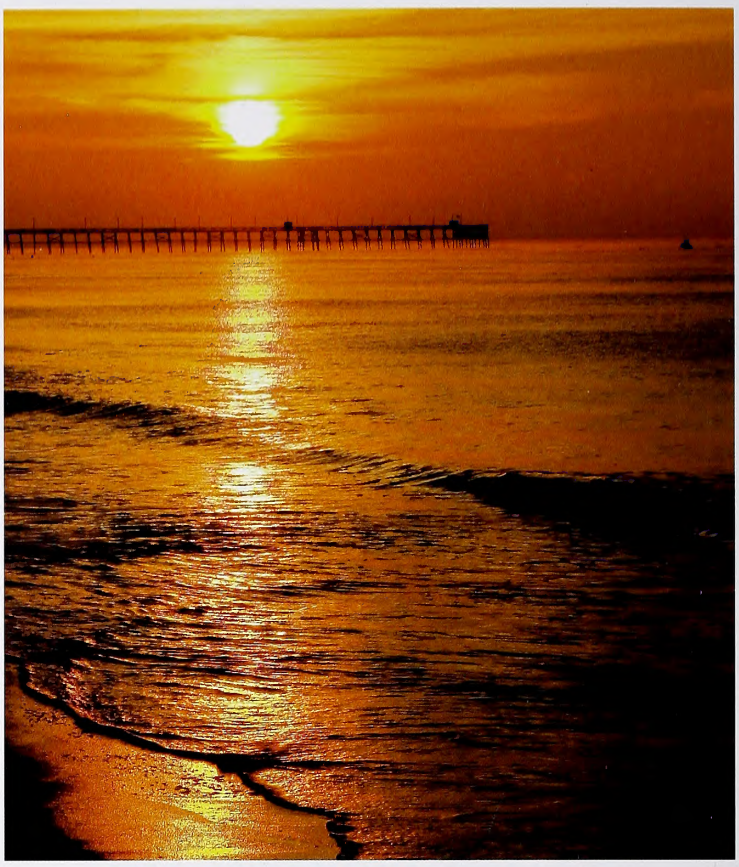
"I'm proud to reopen the pier," Vereen said. "With the cutting of this ribbon, the former Yaupon Pier is officially renamed the Oak Island Pier."

The ribbon fluttered aside in the gentle sea breeze to the applause of hundreds of onlookers. The pier was packed with so many people, the crowd rivaled the masses of anglers that traditionally arrive during the fall spot runs. The spot is a small fish, but so numerous that it is a mainstay of fishing piers and pier fishermen. But Vereen, like most people who visit ocean piers, doesn't fish. He said he usually comes to the pier to see the view and to socialize.

"This pier has been a big part of my life," Vereen said. "It was built in 1954, the year I was born. I've seen people come here to fish, then those people return with their children and then with their grandchildren. It's an honor to have saved this pier for the citizens of Oak Island and for the citizens of North Carolina."

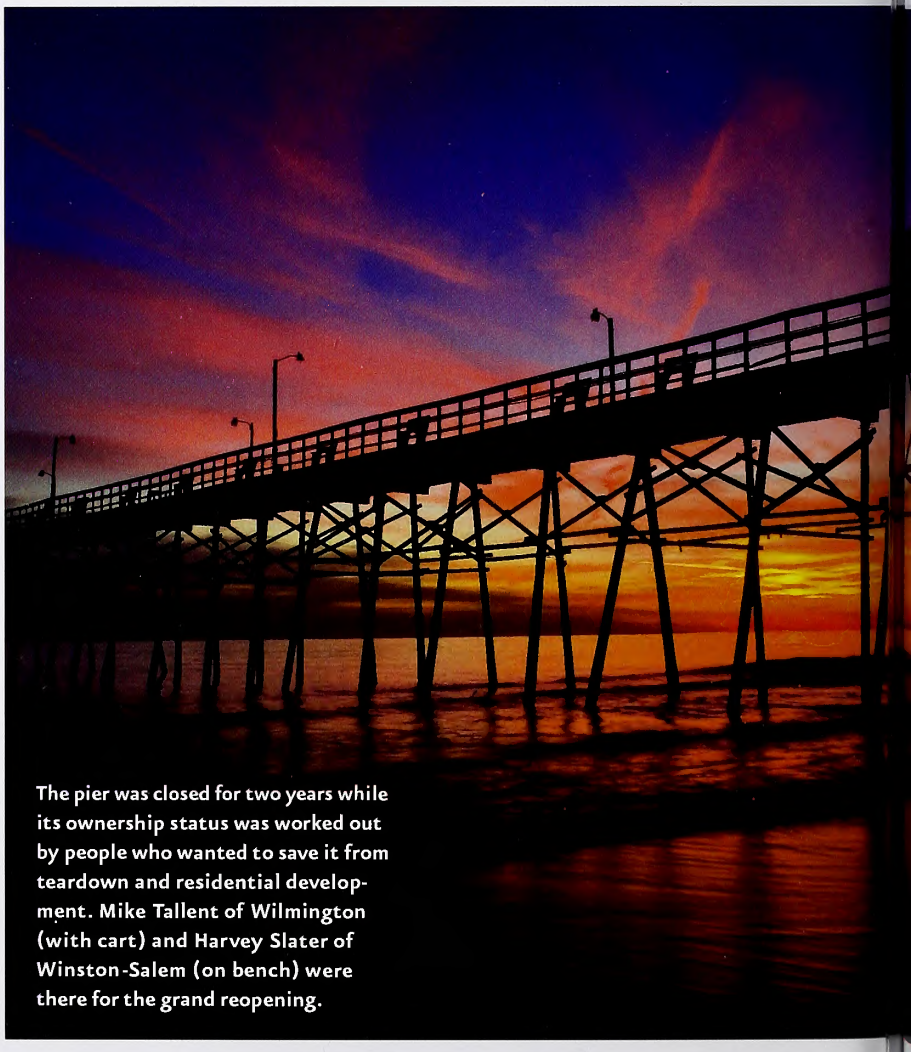
The pier had actually reopened for fishing on the previous Monday, May 11. It had been closed since April 2007, when the bank that owned it decided allowing public access was a liability. Like many other piers that have been lost as providers of public beach access, it had been sold for the purposes of private real estate development. But when the real estate bubble was deflating, Vereen said, the pier, along with several other properties owned by the same real estate corporation, was repossessed by Cooperative Bank.

"We never expected the pier to come up for sale," Vereen said. "It was going to provide some beach access for a local development called the Preserve. When that development failed, Cooperative Bank was going to try to sell off some of the assets to pay off loans, and the pier was going to be split off from the development. I saw that we were losing our access so quickly yet seemed powerless to stop it. I had served on the state's Waterfront Access Commission and thought we



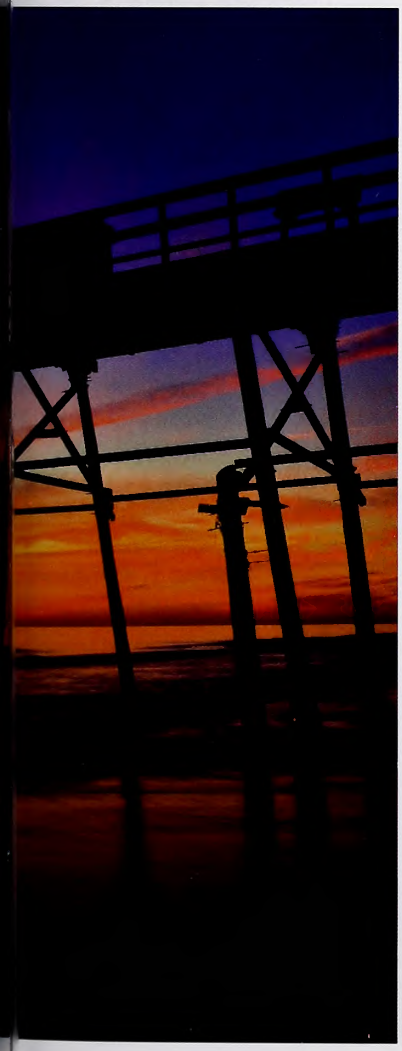
MIKE MARSH

MIKE MARSH



The pier was closed for two years while its ownership status was worked out by people who wanted to save it from teardown and residential development. Mike Tallent of Wilmington (with cart) and Harvey Slater of Winston-Salem (on bench) were there for the grand reopening.

MIKE MARSH



would be doing the right thing for the right reason if we saved the pier. But when I presented the idea to the town board, it became an up-and-down process. Although the pier was enjoyed by many town residents as well as visitors from the rest of this state and other states, a minority of very vocal residents did not want the town to be in the pier business."

Among the contentious issues were how the town would pay for the pier and whether the pier, tackle shop and restaurant would have an unfair advantage over other businesses, including the other surviving pier, Ocean Crest Pier.

Working out these problems resulted in several heated debates, with the original Oak Island Town Council vote favoring acquisition of the pier by a very narrow margin of three to two. Vereen said that to appease opponents, it was agreed that no property tax money would be used for the purchase or operation of the pier, and that a fee structure would be established to assure that the pier would not compete unfairly with Ocean Crest Pier. Another concern was the future of the site in the event that something unforeseen happened to destroy the pier or otherwise make the site available for other uses. To remedy that concern, a conservation easement that would allow the use of the site only for a public pier in perpetuity was created. By the grand opening, all the town council members' concerns had been satisfied.

"If you ask all of the council members, who are here today, they will tell you support is unanimous," Vereen said. "The pier will be paid for primarily with grants and with the proceeds from the accommodation tax. The accommodation tax set up by the state legislature was established for exactly this type of purpose. We've received two grants for the purchase. We also can't give enough credit to our citizens who have raised or donated money for the pier purchase. Their efforts showed how much people wanted to keep their pier open and made council members pay attention. Since the pier will be operated as a concession, the lease fees are also going to support the pier's purchase and maintenance."

Initially, the town's bid of $1.9 million for the pier was considered too low by the seller, so the bid was rejected. But, due to the sliding prices of coastal real estate, the bank eventually agreed to a price of $1.5 million. Once the sales price was agreed upon, the town began seeking sources of funding.

"We secured two grants in the spring and summer of 2008," Vereen said. "One was a $500,000 N.C. Parks and Recreation Trust Fund grant, and the other was a $300,000 N.C. Division of Coastal Management Beach and Coastal Waterfront Access grant. Cooperative Bank agreed to accept a payment of $250 per month until a purchase loan could be approved for the remaining amount."

The town had also set up a Save Yaupon Pier account. Vereen said citizens donated more than $6,500 through that account.

"Another organization that helped the citizens raise money and awareness was the N.C. Public Access Foundation," Vereen said. "They held a surf fishing tournament in August 2008 and donated more than $1,500 raised during the tournament to the town's pier fund. We received another donation from the foundation at the grand opening ceremony." An additional $100 check from the foundation was given to Vereen at the ceremony. The money had been donated online by an Oak Island citizen, Henry Simpkins, through the organization's website.

But although a substantial down payment was assured, the town still needed a large loan to cover the balance due of approximately $900,000, which included the outstanding $700,000 toward the actual purchase price plus another $200,000 for repairs and upgrades. Although the bank agreed to lend the money at a low percentage rate for a 10-year term, another big hurdle remained.

"The Local Government Commission still had to approve the loan," Vereen said. "Their role was making sure the town had the necessary financial resources to make the payments on the loan and had followed all lawful requirements regarding the purchase. The town will continue accepting donations until the pier is paid off. We will also continue seeking grant money to retire the debt. But grant money is getting very scarce. We're fortunate grant funding was available when we needed it the most."

One of the reasons the bank had closed the pier to public use after it received the property through foreclosure was that the pier required some fairly extensive repairs and upgrades. Without the repairs and the Local Government Commission's last-minute approval for the purchase, the grand opening would have been delayed even longer.

"We are fortunate that our public works director, Gene Cugus, is a civil engineer," Vereen said. "He examined the pier, and the

MIKE MARSH

MIKE MARSH

MIKE MARSH

Barry Singletary of Oak Island was pleased with the rebirth of the pier and with his flounder catch there. Then-mayor Johnie Vereen III cut the ribbon to reopen the pier, while local dignitaries showed up in droves (from left): John Ramsey, Vereen, Kathy Thomes, Tommy Thomes, Dara Royal, Mary Snead and Bob Seidel.

town asked for bids. Tommy Thomes submitted the lowest bid for the repairs and was given the contract for the repair work. Tommy also submitted the lowest bid for leasing the pier. He is the former owner of Long Beach Pier. Though some people had said we shouldn't or wouldn't be able to lease the pier as a concession, there is some precedent because the town also operates a golf course. It's not exactly the same situation, but there are similarities between operating a golf course and operating a fishing pier. A lot of municipalities across the state own and operate golf courses, tennis courts, athletic fields and other recreational facilities."

Tommy Thomes retired from operating a small equipment company in Thomasville. He then fulfilled a longtime dream of becoming a pier owner and operator when he bought Long Beach Pier. But he lost Long Beach Pier through a court-ordered sale resulting from a property settlement when he was divorced from his wife, Nora. "I owned Long Beach Pier from 1998 to 2006," said Thomes, who is now age 67. "I tried to hang on to it because I had planned to run the pier as a retirement goal for the rest of my life. It was a huge loss because it took away my retirement dreams."

Thomes said a real estate development company deconstructed Long Beach pier in 2006 to make way for oceanfront residences. But nothing has been rebuilt on the site.

"Long Beach Pier was a great pier, and lots of people really miss it," he said. "If we had lost Yaupon Pier, it would have been really upsetting. We would have been down to just one pier, and it would have hurt the economy of this island. Once the town became involved, they asked me to be on the committee to help save the pier strictly from an advisory standpoint."

Thomes said his son, Tommy, and wife, Kathy, will help him run the tackle shop and pier. But he will sublease the restaurant operation to another party. "Just as we did with Long Beach Pier, the Oak Island Pier tackle shop will be open from March 1 through Nov. 1 and close late at night," Thomes said. "The pier itself will never close, just the gift shop, tackle shop and restaurant, which is named Upstairs at the Beach."

Thomes said the fishing was already fabulous during the grand opening week, with three barracuda and a 100-pound tarpon landed. He said many other species were also biting well. "It's like old times at Long Beach Pier," he said. "The led trout fishing has been nomenal. Fishermen are catching Spanish and king erel, flounder, black drun sheepshead, croaker, red bluefish, spots, sand shark skates. You never know w someone will reel in next."

Despite the excellent fi Thomes said, most visitors came to walk on the pier, p stopping at the pier house some ice cream before ste out into the salty air. He s had experienced similar p age when Long Beach Pie still standing.

"Our pier fishing ticket have to be 5 percent highe Ocean Crest Pier's fees," T said. "That offsets the criti that having a publicly owr will create unfair competi other businesses. Our traffic has beer ilar to what we experienced at Long B Pier, and other things will remain the For example, all kids under age 10 fis We've worked hard on programs to g out on the pier because the pier is a family atmosphere. There are no pa meters here like there are at some ot beaches, but there's usually no prob finding a parking space. It doesn't c dime just to walk out on the pier and at the ocean and beach. A pier is rea social gathering place, the heart of beach town. Without a pier, a beach t loses its charm."

Out on the pier, Ben Carter of Pilot tain was fishing with his 10-year-old son, Triston Parks of Oak Island. Tr felt a tug on his line, then set the ho lifting his spinning rod. Reeling a wr whiting up to the pier deck, he dang for his grandfather's inspection and "What kind of fish is this?"

"It's the good eating kind," Carte "Make sure you put that one in the and not in the bait tank at the end of th

Carter eyed the gated fence with t tank on the opposite side a few yards A sign said access was allowed only t mackerel fishermen. An array of king erel trolley rods and fighting rods st attention. Secured to the pier rails, th curled up and down to the gentle ri

he waves as their owners watched
or at least listened for the scream of a
ig clicker to announce a king mack-
d struck a live bait as they socialized
her king fishermen.
shed here before the pier closed,"
said. "It hurt my feelings when it was
because it's the only pier I ever fished.
find the words to tell you what it means
it open and be able to come here to
ain."
een watched all the goings-on, the
fishing, sightseers smiling, children
, hungry celebrants partaking of the
t dog lunch provided for the grand
g below on the beach. He walked out
pier, beyond the access incline, beyond
dium where he had given his grand
g speech, beyond the cut ribbon waft-
urls against the pier guardrails. Out
among the fishermen and board-
s, he turned and stood silently for a
onds before nodding his head toward
r house and the rows of cottages in
kground.
on't even fish," Vereen said. "But I've
come to the pier just to walk out and
ou might hear some interesting stories
people you may not have seen for a
pier is a beach town's front porch.
g is as inspiring as walking out on a
rning around and looking back at the
It's a view money can't buy. When
k back toward the beach, you're
at home."

arsh is a regular contributor to WINC.
re information about Oak Island Pier,
0) 278-6464.

NCPAF INC. AND NCFPS PRESERVE PIERS AND OTHER PUBLIC ACCESS PLACES

The N.C. Public Access Foundation (NCPAF) Inc. is a 501(c)(3) tax-exempt, nonprofit corporation founded by Mike Marsh and Al Baird. Baird is also the founder of the N.C. Fishing Pier Society (NCFPS).

"I founded the N.C. Fishing Pier Society in 2006," he said. "Long Beach Pier had just closed the previous January, and my son, Chris, and I started to get information together about the plight of the piers. We live in Fort Mill, S.C. But I have always fished North Carolina's piers because they are the best ocean-fishing piers in the world. I thought I needed a vehicle to get the word out so people could try to find a way to keep from losing their piers. Then Sportsman's and Triple S piers announced closings later that summer. Later, the N.C. Aquarium Society helped the state get control of Jennette's Pier before we lost it."

Baird had been sending monthly newsletters but began posting messages online for efficiency since he was essentially heading a one-man society. He said it was too time-consuming to send e-mailed newsletters, and people were constantly changing e-mail addresses or his newsletters were being blocked by spam filters.

The NCFPS costs nothing to join and has about 400 members. All that is required is to sign up for membership by visiting the website.

The most glaring problem Baird experienced was that many people wanted to donate money to fund the education effort and to try to help buy fishing piers. Marsh, an outdoors writer from Wilmington, saw the same situation occurring with boat ramps that was happening with fishing piers. These traditional, privately owned public access points were being sold for conversion to exclusive private residential use at an alarming rate.

"Mike and I met at Johnnie Mercer's Pier during the annual dogfish tournament in January 2007," Baird said. "We talked about the fact that the same thing that was doing away with the piers was eliminating the boat ramps. Mike mentioned the nonprofit idea, and we talked about how it could help private citizens save their traditional access. I had no idea how to go about setting up a nonprofit charity, but Mike did. There was no place for private citizens to turn if they wanted to help financially, so we decided to give it a try. There are lots of conservation groups, but not a single one of them is dedicated solely to securing public access. We set up NCPAF, Inc. so it can receive tax-exempt donations for enhancing and acquiring all forms of public access, not just boat ramps and piers. It's a way for citizens to help, because there will never be enough tax money or user fees to stem the tremendous loss of access that has already occurred and is still occurring in this state."

It took an incredible amount of time and effort, but Baird and Marsh used their personal resources to found NCPAF Inc. So far, the foundation has operated with only private donations, but it can also receive grants or other public and private funding. For more information, visit the NCFPS website at www.ncpfs.com and the NCPAF, Inc. website at www.ncpafonline.com.

Small PACKAGE, BIG DOG

Intelligent and eager, Boykin spaniels meet the needs of many of today's upland and waterfowl hunters.

WRITTEN BY MIKE ZLOTNICKI
PHOTOGRAPHED BY KEITH HENDRICKSON

MIKE ZLOTNICKI

Boykin spaniels are at home in a duck marsh or around the house.

ıe second day of the 2009 dove season was
›vercast and chilly as Blake Waggoner sat on
he edge of a harvested cornfield in northern
: County. As he scanned the gray sky for
a chocolate-colored dog named Grace at his
l the same, her brow furrowed slightly over
eyes.

‹ brown retrievers are not uncommon in dove
r duck swamps — chocolate Labradors and
nesapeake Bay retrievers are the usual sus-
But Waggoner's charge was neither a leggy
a burly Chessie. Grace is a Boykin spaniel,
sized compared to the larger retrievers but
an asset in the field and an easy keeper in
se.

h Carolina has a mixed bag of contributions
reater good (Vanna White, Santee-Cooper
Marshall Tucker Band notwithstanding), but
sportsman, the Boykin might top the list. In
: Boykin's heritage traces back to Spartanburg
›me to the Tucker boys) and to the crossroads
nity in Sumter County from which the breed
name.

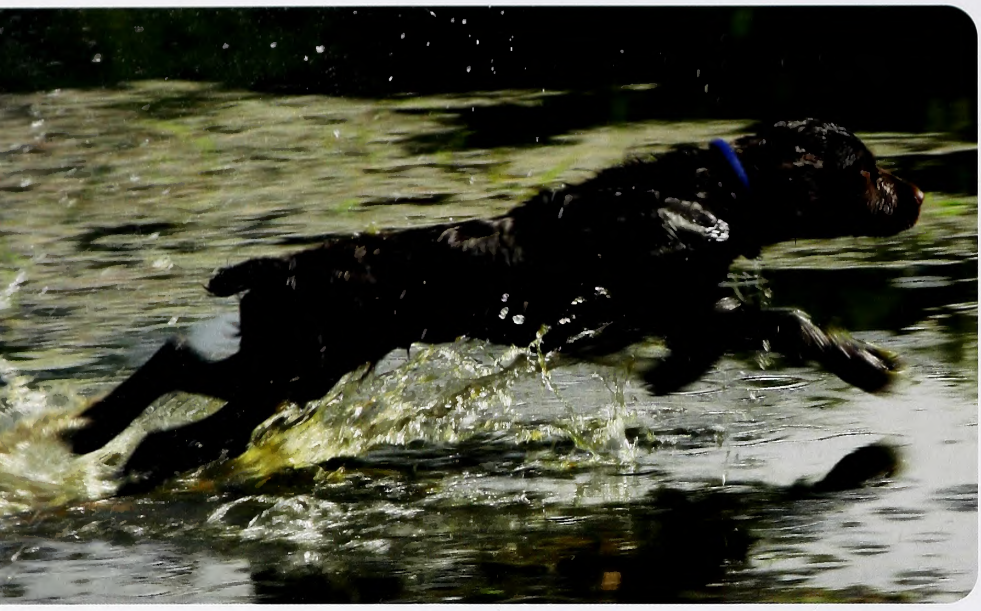
HISTORY OF THE BREED

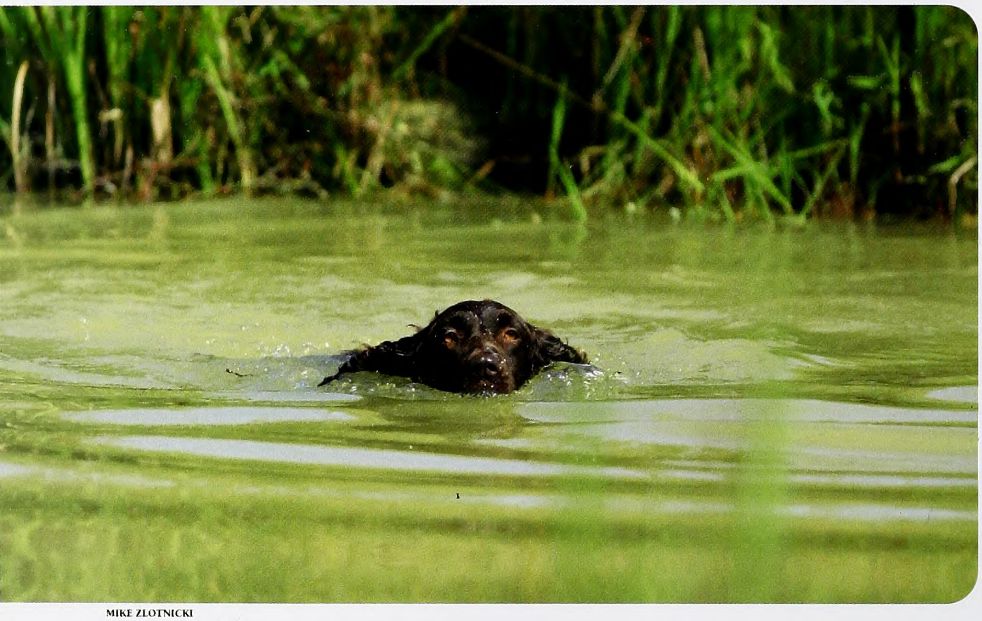
The early history of the breed is a tad hazy, but Bill Crites knows it as well as anyone. Crites, an environmental engineer who lives in Columbia, S.C., has owned Boykins for about 20 years and served for six years on the board of the Boykin Spaniel Society.

"A guy named Mr. [Alec] White found this little dog in a train station in Spartanburg, and it followed him to church," said Crites. "Mr. White was a big hunter, and one of his friends was Mr. [Whit] Boykin."

Boykin was trying to develop a smaller retriever to hunt ducks and turkeys in the Wateree Swamp. Much of their hunting was done in "section" boats, portable craft that fit together like a nesting doll. "You can imagine a big dog jumping out of a little boat," said Crites. "You'd go swimming in the Wateree Swamp."

Boykin took the little dog named Dumpy home and eventually bred him to a small dog found unclaimed in a crate at the Camden railroad station. From this unlikely pairing between 1905 and 1910 came the foundation of the Boykin spaniel, which is also one of the few homegrown American breeds.





MIKE ZLOTNICKI

Keeping true to the melting-pot heritage, C
said, other blood was added to the original st
hone the hunting edge. "We know for sure th
Chessie; that's where the gold eyes come from
Crites, whose wife, Dawn, is also an enthusias
know for a fact there's American water spanie
there's some springer spaniel."

Crites said that the two most common retr
at that time were the Chesapeake Bay retrie
and the American water spaniel. Obviously
was well before the explosion of the popularit
the Labrador retriever.

Like many of the Continental breeds, the I
has a docked tail. "The tail's docked becaus
wagging tail was not conducive to turkey hun
said Crites.

Some folks may confuse the Boykin with a
spaniel. Try not to vocalize it around a Boykin
"Most everyone will buck right up and give th
education," said Crites. Cockers, like several
once-proud field breeds, have been diluted ov
years for show and pet stock, something Bo
owners are keenly aware of.

A COMMON PATH

A background in big dogs—retrievers and p
ing breeds—is a common trait among Boy
owners. "My brother always had pointing d
said Waggoner, who is the vice president of a
state retail company. "I lived on my brother's
and shorthairs."

Waggoner got his first Boykin, Grace, in
"I hadn't had a dog since I was a kid," he said
Boykin appealed on several levels. "You got a
and you don't want a dog that eats the house
I don't do a lot of big-water duck hunting."

Crites' experience was similar. "My grand
was a big bird dog man. I came from West Virg
South Carolina about 21 years ago. I bought m
one out of the paper and gave it to my then-girl
now my wife. I think that sealed the deal," he
with a laugh.

The breed's tractability and personality me
with today's wing shooter. "We kind of look a
as next century's dog," said Crites, who also
English setter in his kennel. "We don't hunt t
our daddies did. If you hunt 12 days a year, yo
not want to keep a Lab or Chessie."

The Boykin Spaniel Retriever Club, found
1982, has about 75 members who are owned b
"little brown dogs" and holds bimonthly field

**Boykins are sometimes said to be
century's dog," perfect for the du
hunter or upland bird hunter (ri
whose trips afield might be fewer
his father's were.**

n and South Carolina. The club held one trial
and Run Farms in Louisburg last year. The
vas similar to what one might see at a typical
bit scaled down. Boykins aren't Labs, but
nt tool for many of the same jobs. A third
of the average Lab, Boykins weigh between
40 pounds and top out around 18 inches
houlder.
members drove as many as six hours to test
ps in water and land retrieves up to 125 yards
ice. Four classes from Junior Puppy to Open
to experience levels for both dogs and hand-
l the atmosphere was more cooperation than
ition. It was here that the Boykin's utility as
tner and family dog shone bright. Mathias
ah Linden of Raleigh brought eight-month-
py Grady.
wanted a hunting dog, and I wanted a small
et," said Sarah after Mathias had worked
a puppy series. "Now that I have the little
going to start looking at hunting local
" said Mathias, who duck hunts Pamlico
The Lindens seem prototypical Boykin
; urban and looking for a multipurpose
easy both in the house and in the field.
ard not to smile watching a Boykin work in
. They don't lack the drive of a bigger Lab,
t display it differently. Like all dogs, each
has its own personality, but sometimes their
l eagerness give them an almost impish
Their desire to please is evident, and though
field may be the Boykin's best playing field,
watching one retrieve a mallard reveals no struggle on the dog's part.

For some owners, the competition of a field trial serves other purposes. "I am competitive, but the dog just took me with her," said Waggoner of his start. "It took me two years to get to field trials. It's kind of like a community. You're all there for the same reason, and if you start winning, it's icing on the cake. I've also learned to be a better trainer."

The sense of camaraderie is almost palpable at the trial. "These are some of the most loyal owners I've ever seen. These people are crazy," Waggoner laughed. "I've seen them raise thousands of dollars at the drop of a hat."

They may be crazy, but crazy like the proverbial fox. The Boykin Spaniel Society keeps a surplus of funds totaling over a quarter of a million dollars. Several decades ago the breed had a problem with hip dysplasia. Today the society has a subsidiary, the Boykin Spaniel Foundation, founded to help overcome detrimental genetic traits. The foundation now provides reimbursement to owners who have their dogs checked for genetic disorders, and it provides grants to university veterinary schools at Georgia, Auburn, Cornell and N.C. State.

TRAINING

Joel Porter of Cherryville knows a thing or two about training Boykins. As a pro trainer at Crown Creek Kennels with over 16 years of experience, he sees more and more Boykins in addition to the Labs, goldens and Chessies. Socialization is key.

ALL ABOUT BOYKINS

The Boykin Spaniel Society was founded in the summer of 1977 in Camden, S.C. Within the first year the society had more than 300 members from 25 states. An official registry for the breed was started in 1979. The Boykin Spaniel Society has now grown to more than 2,000 members hailing from every state in the union as well as Canada, Switzerland, Austria and Germany.

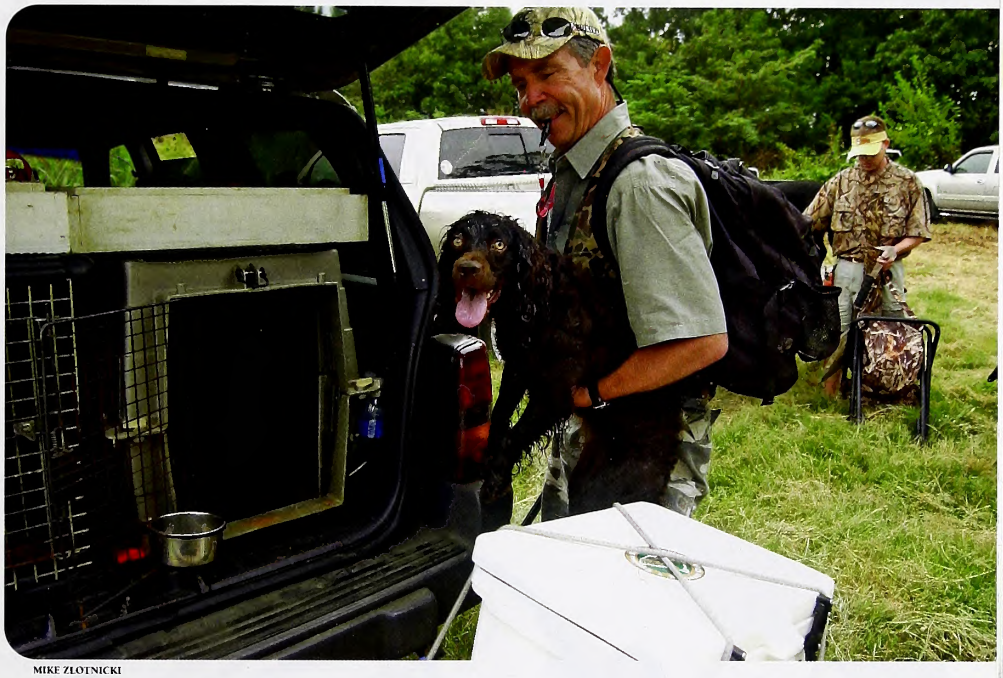
The Boykin Spaniel Society's first annual National Hunting Test was held May 23, 1980. Since then the competitors have grown steadily in numbers and ability, attracting dog owners and handlers from all parts of the country. A National Hunting Test is held each spring in South Carolina. Boykin spaniels now compete regularly in sanctioned trials of the North American Hunting Retriever Association and the Hunting Retriever Club, Inc.

In 1982 a cooperating organization named the Carolina Boykin Spaniel Retriever Club was formed. The group holds six hunting tests a year, training classes, seminars and judging clinics.

gest thing with a Boykin is early social-
–human, bird and field," he said. "You really
socialize a Boykin early on to guns, birds
r, especially water."
r said that the trainer needs to be mindful
g's size and physical characteristics when
and hunting. "The Boykin doesn't have the
mass and double coat [of the Lab] to sustain
waters," Porter said.
Boykin's small size means that hunters need
ndful of the hunting scenario, Porter said.
vns that might not hamper a longer-legged
n slow down the smaller dog. The big water
rrituck might not be the Boykin's milieu,
ypress swamps of eastern North Carolina
e it excels for water work, in addition to the
ds. Porter also advised not to discount the
or upland work as part of its versatile profile.
y're phenomenal flushing dogs," he said.
ay be their forte. They may be the flushing
eving versatile dog like the shorthair is the
, and retrieving versatile dog. They're also
t family dogs." Porter said that what the
acks in size it makes up for in heart. They
the early socialization, and the trainer needs
tt the dog's pace, not the trainer's pace.

OGS

ess-minded as they are in the field, Boykins
ownright impish at home. Dawn Crites has
an a few stories about her dogs. "They're
he said. "They love toilet paper, Kleenex.
w on furniture. I have two chairs by the bay
and they've ruined the arms jumping on
bark at the birds outside."
some other breeds, Boykins hide food and
es. "Our first Boykin, Maggie, buried bones
puseplants," said Dawn Crites. "I'd find
rs later when I'd re-pot the plants." Dawn
her "girls" can sing and dance. All she has
cratch their butts. She cautions that this is
al Boykin behavior. "Not everybody's chil-
as talented as mine," she said.
te their small stature and agreeable man-
Boykins are still canines. In the predawn
outside his Durham home, Waggoner was
equipment into his vehicle before heading
e dove field. Grace and Faith were crated
ck. A stranger offered his hand in greeting
ogs to sniff, and they went from docile to
in a split second. Waggoner explained that
bination of their master's property and their
nent made them more defensive than nor-
stranger was relieved he did not "draw back
s they say in the South.
in the dove field, Waggoner related a favorite
out Boykins. "We were tundra swan hunting
otts Island near Currituck," he said, "and



MIKE ZLOTNICKI

Blake Waggoner of Durham loads up after a day in the dove field with one of his versatile Boykins.

someone knocked one down. Faith was all keyed up, so I said, 'Go, Faith.'" Waggoner grinned as he told the story. "The dog was 28 pounds, and what's a swan weigh, 20? She brought back three more that day. Seeing that little dog go out and get that swan was big stuff."

And that epitomizes the Boykin. Its calling card is versatility; equally at home on a couch or in a blind, it is the canine equivalent of the utility infielder. It is a Carolina original, courtesy of our neighbors to the south, coming soon to a dove field or duck swamp near you. ◆

Mike Zlotnicki is a veteran outdoor writer living in Garner and an occasional contributor to Wildlife in North Carolina.

FOR MORE INFORMATION:

The Boykin
Spaniel Society
P.O. Box 2047
Camden, S.C. 29020
(803) 425-1032

boykinss@boykinspaniels.org
www.boykinspaniel.org

Mid Atlantic Boykin
Spaniel Club
Ayden, N.C.
Scott Culbreth, Secretary
sculbreth@suddenlink.net
(252) 527-2332
Find them on Facebook

NORTHERN MOCKINGBIRD

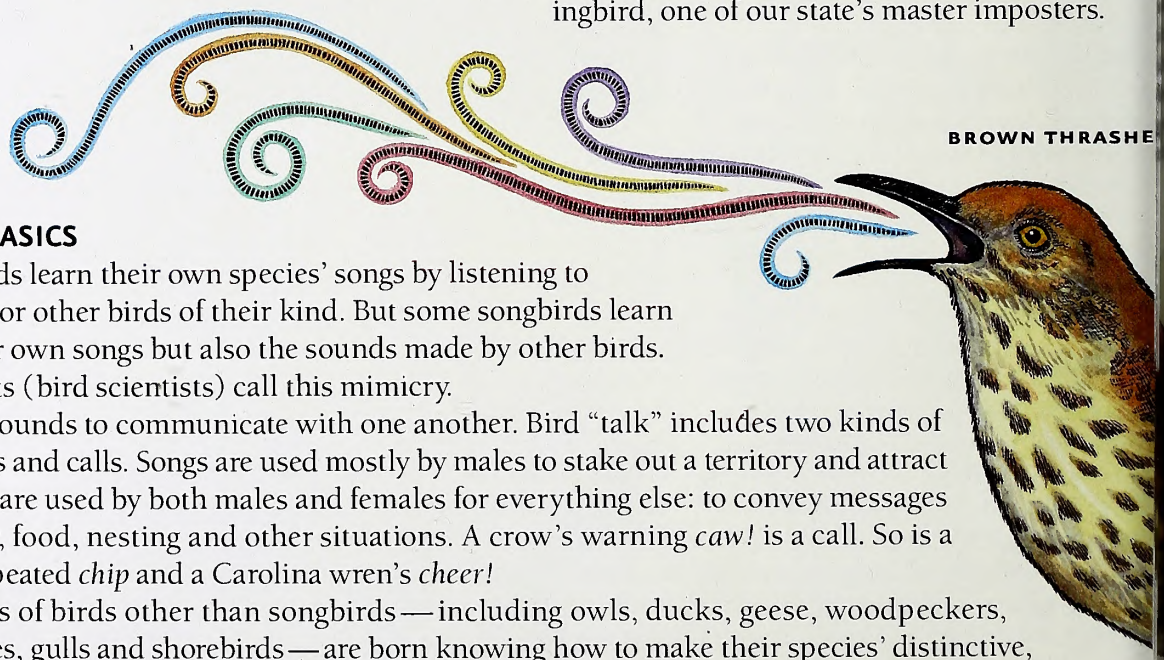
Why do some birds mimic others? Which kinds imitate other species? Scientists are still working on the answers.

The Great Imposter

written by Terry Krautwurst / illustrated by Consie Powell / nature activity by Anne M. Runyo

No other bird can match the Northern mockingbird's ability to imitate so many sounds around it — including not only dozens of other bird songs but also such sounds as croaking frogs, chirping crickets, tinkling piano keys, ringing cell phones, squeaking gates, barking dogs and whistling humans!

Fee fee fee fee . . . jrrrt, jrrrt, jrrrt, jrrrt . . . wick, wick, wick . . . too-weet, too-weet too-weet! The birds in your backyard seem to be chattering, chirping, warbling, and whistling even more than usual, so you look outside expecting to see at least a dozen different kinds. But instead, you find only a single gray bird perched atop a branch, singing almost nonstop. All those sounds are coming from just one soloist! Wait a minute: did it just sing a cardinal's *purty purty purty*? And was that a Carolina wren's *tea-kettle, tea-kettle, tea-kettle*? Hey, did that bird just make *cricket* sounds? And now, wasn't that a tufted titmouse's *peter-peter-peter*? Chances are you're listening to a Northern mockingbird, one of our state's master imposters.



BROWN THRASHE

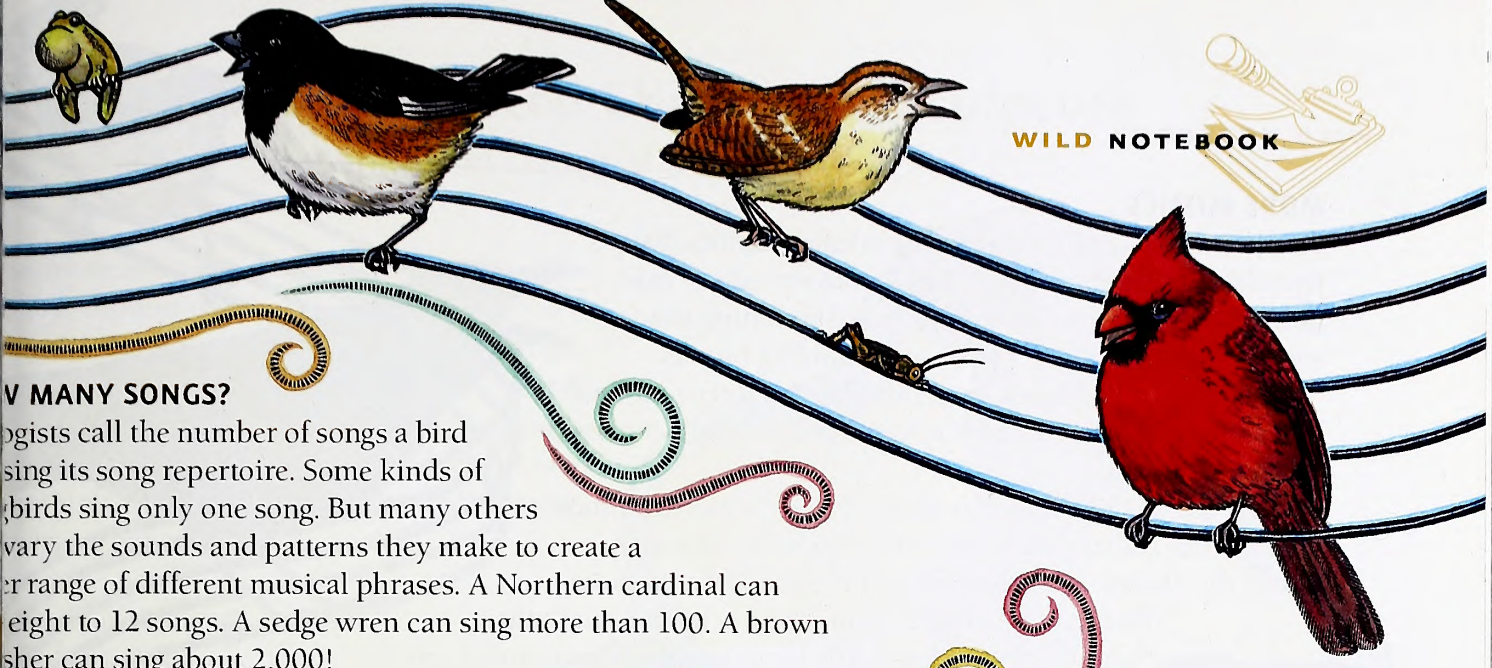
BIRD TALK BASICS

Most songbirds learn their own species' songs by listening to their parents or other birds of their kind. But some songbirds learn not only their own songs but also the sounds made by other birds. Ornithologists (bird scientists) call this mimicry.

Birds use sounds to communicate with one another. Bird "talk" includes two kinds of sounds: songs and calls. Songs are used mostly by males to stake out a territory and attract a mate. Calls are used by both males and females for everything else: to convey messages about danger, food, nesting and other situations. A crow's warning *caw!* is a call. So is a cardinal's repeated *chip* and a Carolina wren's *cheer!*

Most kinds of birds other than songbirds — including owls, ducks, geese, woodpeckers, pigeons, doves, gulls and shorebirds — are born knowing how to make their species' distinctive, and usually simple, songs and calls. Baby songbirds, too, already know their species' calls.

But songbirds have to learn how to sing their songs. They have more complex vocal systems than other birds, and their songs are often more complicated.



V MANY SONGS?

ɔgists call the number of songs a bird sing its song repertoire. Some kinds of birds sing only one song. But many others vary the sounds and patterns they make to create a r range of different musical phrases. A Northern cardinal can eight to 12 songs. A sedge wren can sing more than 100. A brown sher can sing about 2,000!

Y MIMIC?

t songbirds are able to learn to sing only their own ies' songs. Mimics take song learning a step further and the sounds made by other birds to their repertoires. The reasons be different for different species. In some bird species, females are cially attracted to males that can sing many songs. So perhaps some mimic es borrow other birds' songs to build larger repertoires and show off to potential s. Some mimics may sing other birds' songs to keep those birds out of its territory. be mimicry isn't about "fooling" other birds at all.

GRAY CATBIRD

birds learn all the songs species sings within first year, but mock- rds learn and add new s to their repertoires ghout their lifetimes.

MEET THE MIMIC THRUSHES

Among North Carolina's best known imposters are three members of the mimic thrush family: the Northern mocking-bird, the brown thrasher and the gray catbird. All are long-tailed, medium-size birds common throughout the state.

Singing loudly day or night from a high perch while facing the sun, moon or other light source, like a crooner in a spotlight, a male mockingbird looking for a mate may sing for hours. He repeatedly uses a repertoire of up to 300 different song phrases—some his own, and some imitated. Each phrase is repeated three or more times before changing to the next.

Like mockingbirds, brown thrashers and gray catbirds also have large repertoires; the brown thrasher's is the largest in the bird world, and a catbird can sing up to 400 song phrases. Unlike mockingbirds, though, most catbirds and brown thrashers only sometimes add a mimicked song or sound to their performances, singing mostly their own songs or making them up on the spot. Some individual catbirds and thrashers, however, add mimicked phrases often.

All three birds sing long, rambling concerts. You can tell them apart the same way the birds do: by listening to the way they repeat phrases. The mockingbird usually sings phrases three or more times. The brown thrasher typically sings a phrase only once or twice. The catbird's squeaky, less musical songs have no predictable pattern—but often include a catlike *meow* that gives the bird its name.

MORE MIMICS

Blue jays, ravens and crows also are talented mimics. Blue jays often imitate the high-pitched *keeeeeeer* calls of red-tailed hawks. Ravens have been heard imitating the sounds of groaning tree trunks and bubbling brooks.

Crows, ravens and mockingbirds also can learn to mimic human speech—but usually only in captivity, like pet parrots and mynahs.

Some scientists believe that mimicry may be more common than we now realize. Many cavity-nesting birds, for instance, mimic the hissing of a snake when threatened by a predator.

Perhaps other birds mimic their neighbors and other sounds in ways too subtle for us to tell without careful scientific research. Ornithologists are only beginning to understand how birds learn their songs, and why some—perhaps more than we know—are great imposters.

BLU

CROW

RAVEN

Get Outside

Use Your Ears to Identify Birds: Often birds are easier to hear than to see. By knowing the songs and calls of the birds around you, you can identify even the ones hidden in trees and bushes. The best way to learn bird songs is to spend time outside watching and listening. Start by listening carefully to a bird you know—perhaps an American robin. Listen not only to the tune, but to its rhythms and patterns. Does the bird repeat itself? How many notes does it sing? Are the sounds whistles, buzzes, chirps? Learning to listen carefully is the key to learning bird songs.

Use Recordings As Learning Tools: There are many CDs, DVDs, tapes and websites that feature recordings of birds' songs and calls. Together with a field guide, they can help you match the bird sounds you hear outdoors to the birds making them. You can also make your own tape recordings of the birds you hear.

Be Your Own Bird Mimic: When you listen to a bird or a recording of one, try whistling or humming or otherwise mimicking the sound yourself. Try a great horned owl's *hoot-hoot-hoot-hoot-hoot* or a crow's *caw*. How about a cardinal's *purty-purty-purty*? Even if you can't copy a song or call exactly, trying to imitate it helps you learn its rhythm and tone.

Read and Find Out

- "The Young Birder's Guide to Birds o
  North America" by Bill Thompson
  Houghton Mifflin, 2008.
- "Stokes Beginner's Guide to Birds:
  Region" by Donald and Lillian Sto
  Little, Brown and Company, 1996.
- "Birds of the Carolinas Field Guid
  Stan Tekiela, Adventure Publicatio
- "Songbirds: Celebrating Nature's Vo
  Ronald Orenstein, Sierra Club Boo

In *Wildlife in North Carolina:*

- "Bird Brains" by Julie Dunlap, June
- "Song of the South" by David Lee, Ju

Find out more about Project WILD W
and literature at the Wildlife Comm
website at www.ncwildlife.org.

Yellow-breasted Chat Paper Sculpture

The Song and Dance of a Secretive Mimic Bird

secretive imitator is the yellow-breasted chat, a ummer resident that nests in blackberry brambles nd other dense bushes in the mountains and across he Piedmont. More easily heard than seen, the chat ngs loudly for a mate with a series of sharp squawks, heeps, whistles and bits of borrowed songs from ther birds. He sings from a perch, or while flapping ownward in a colorful flight display.

opy on cardstock (140% = life size).

ut out blue shapes.

recisely fold body in half. Cut out along black ne, and cut shoulder slot.

nfold, glue head at beak.

recisely fold wing box in half, and cut out ong black line.

lue wing top and undersides together.

ut glue on diamond and slip wings into slot.

inch down along ···· lines on body, and fold up ong ---- line to sculpt shoulders.

old tail up along ---- line, and pinch down.

url, overlap and glue yellow breast shut.

ap wings and wag tail to create flight display.

©Anne Marshall Runyon

Wildlife Commission Saving Money Across the State

More than five years after opening its energy-saving headquarters, the N.C. Wildlife Resources Commission continues to incorporate green design and practices into its building and other sites across the state.

Since opening its doors, the utility consumption of the wildlife headquarters and education center on N.C. State University's Centennial Campus has been reduced by more than 44 percent. The commission has saved more than $100,000 in energy expenses, in spite of constantly rising energy costs, by using energy-efficient practices in the building.

"Our building was designed to reflect our agency's dedication to conserving our state's natural resources," said Erik Christofferson, chief of the commission's Division of Engineering Services. "We are excited to continue that path with our buildings and sites across the state — not only saving energy, but saving the state's money in the process."

The commission has saved $1,800, or 28 percent, on natural gas consumption in its Raleigh warehouse during the last fiscal year by installing programmable thermostats. The commission also saved $775 and lowered energy consumption by 23 percent at its Edenton Depot by installing occupancy sensors.

In addition, 45 occupancy sensors, 20 programmable sensors and dozens of compact fluorescent light bulbs have been added to depots and hatcheries across the state. Solar-powered lights have been installed at some Boating Access Areas.

PETER

The Wildlife Commission moved into its headquarters building in September 2005.

The Wildlife Commission's headquarters received a "gold" rating for sustainability and environmentally friendly design from the nation's leading green building rating system, the U.S. Green Building Council's LEED system.

The headquarters building features state-of the-art design elements to maximize energy conservation and minimize impacts on the environment. It incorporates bio-retention cells and wetlands for storm water management. Planted with native, drought-resistant plants, the cells help preserve the natural habitat of nearby North Creek.

The building has windows, high and an open floor plan to maximiz light and reduce the need for artific The artificial light that is used is co by timers, automatic dimmers and o sensors to help save utility costs. M the materials used to construct the — as well as office furniture — are co from recycled materials, certified w low emitting materials, all with the reducing total impact on the enviro

For more information on the hea building, visit www.ncwildlife.org a on Education Centers.

e NEWSLETTER
Get N.C. Wildlife Update—news including season dates, bag limits, legislative updates and more—delivered to your Inbox from the N.C. Wildlife Resources Commission. Sign up at www.ncwildlife.org/enews.

aley New Supervisor of Field Operations

ew Year ushered in new leadership in the Division of Law Enforcement C. Wildlife Resources Commission. h Templeton, supervisor for field as, retired effective Jan. 1. His suc- Jack Staley, previously a captain t 5, a jurisdiction that includes e, Rockingham, Orange, Granville, Person, Caswell, Randolph, , Lee and Guilford counties. onfident that the transition will be one," Templeton said. "I am pleased direction that the division is headed ure there are some exciting times on on."

will be responsible for supervising le hierarchy of some 200 uniformed fficers who enforce the fish and game ns and boating laws of the state. He ar veteran of wildlife enforcement s 19 years of field supervision to the holds a business administration m Elon University. "The mission vation and public safety carried on

GEOFF CANTRELL / NCWRC

Major Jack Staley has his oak leaf insignia pinned by his wife, Connie.

by our wildlife officers is critically important," Staley said. "There are challenges before us, but there are opportunities, too. And there will be a continuation of the firm and fair application of the law, just as there was under Maj. Templeton."

Sportsmen and the public can assist wildlife officers in their duties by reporting violations any time by calling 1-800-662-7137.

alat Releases New Edition of 'Surf Fishing'

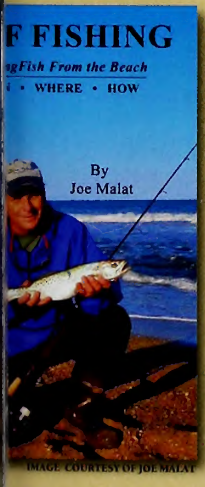


IMAGE COURTESY OF JOE MALAT

In 1993 Joe Malat wrote "Surf Fishing: Catching Fish from the Beach," a 44-page, softcover book, published by Wellspring. The book soon became a must-have for Mid-Atlantic and East Coast surfcasters.

Malat has now released the new, second edition of "Surf Fishing" as he continues to share his knowledge gained in more than 40 years of fishing the surf. The expanded second edition discusses the tackle, techniques, baits, lures, rigs and knots used to take more than 15 species of fish from Atlantic and Gulf Coast beaches. Malat also discusses how to "read" the beach, and what effects tides, wind direction and water temperature have on the feeding habits of fish.

Many big fish are lost in the final few feet of the fight. Malat has caught his share, and he explains, step-by-step, how to put a trophy catch on the beach.

is no coffee table book," Malat said. "It is designed to be a frequently used refer- should be in every surfcaster's tackle bag, and I guarantee before long the pages ll worn and salt-stained. From the selection of rods and reels to careful catch-and- s all covered in this book," he added.

cond edition of "Surf Fishing" is available at book stores, coastal gift stores and ps, or the book may be ordered directly from the author.

ww.joemalat.com to see a preview of "Surf Fishing" and Joe's other books, "Pier nd "Let's Go Crabbing," and to order personally autographed copies.

Check Off for Nongame

North Carolina can claim more than 1,000 nongame mammals, reptiles, birds, amphibians, mollusks and crustaceans. Nongame wildlife includes all wild animals except those that can legally be taken by hunting and fishing. Many nongame species are common and can be viewed in your own backyard. Others are rare and seldom seen.

The Nongame and Endangered Wildlife Program strives to prevent species from becoming endangered through maintaining viable, self-sustaining populations of all native wildlife, with an emphasis on species in decline.

The Nongame Program is part of the Division of Wildlife Management of the N.C. Wildlife Resources Commission. Funding for the Nongame Program is provided in part by the N.C. Tax Check-Off for Nongame and Endangered Wildlife. The tax check-off enables North Carolina taxpayers to donate a portion of their state income tax refund to nongame wildlife conservation.

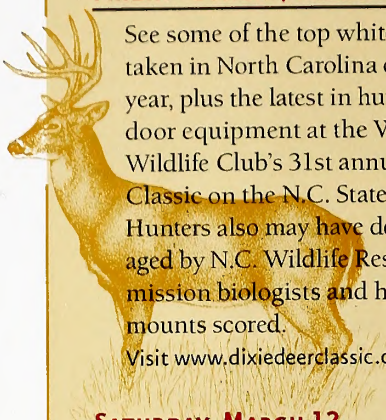
To contribute to the Nongame and Endangered Wildlife Fund, please enter a donation amount on line 30 of your North Carolina income tax form. If you are not eligible for a refund but would still like to contribute towards nongame wildlife conservation, please send your donation to: Nongame and Endangered Wildlife Fund, 1722 Mail Service Center, Raleigh, N.C. 27699-1722. All donations are tax-deductible.

Since it began in 1983, the Nongame Program has funded projects to help sea turtles, bald eagles, peregrine falcons, freshwater mussels and many other native species.

NORTH CAROLINA NONGAME & ENDANGERED WILDLIFE FUND

CALENDAR OF EVENTS

Friday–Sunday, March 4–6



See some of the top white-tailed deer taken in North Carolina over the past year, plus the latest in hunting and outdoor equipment at the Wake County Wildlife Club's 31st annual Dixie Deer Classic on the N.C. State Fairgrounds. Hunters also may have deer jawbones aged by N.C. Wildlife Resources Commission biologists and have their mounts scored.

Visit www.dixiedeerclassic.org.

Saturday, March 12

Learn about saltwater fishing at the Get Hooked Fishing School at the N.C. Aquarium at Pine Knoll Shores. Contact Pam Pittman (252) 247-4003, ext. 257 or 225 to register.

Friday–Sunday, March 18–20

Check out hunting and fishing exhibits, wildlife art displays, decoys and boats and the N.C. Wildlife Resources Commission exhibit at the Cape Fear Wildlife Expo at the Wilmington Convention Center.

Visit www.capefearwildlifeexpo.com.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

IN SEASON

This month, these seasons are open in North Carolina:

Light Geese (Snow, Blue and Ross'): Through March 9.

Roanoke River Striped Bass Management Area: March 1–April 30 unless closed by proclamation.

There is no closed season or bag limit for groundhog, coyote, striped skunk, nutria and armadillo. There is an open season for taking beaver with firearms or bow and arrow during any other open season for the taking of wild animals.

Check the *2010–2011 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

Volunteer Hunter Ed Instructors Honore

The N.C. Wildlife Resources Commission has recognized nine volunteers who teach hunting education as the agency's "Instructors of the Year."

The instructors, each representing one of nine districts statewide, were presented a commemorative model Henry Golden Boy .22 caliber rifle in tribute to their service.

"These nine men and women provided exemplary service for 2010 and deserve the recognition," said Travis Casper, state assistant hunting education coordinator. "They and the other 772 hunter education instructors currently active in North Carolina have earned our gratitude. Their dedication and commitment to teach free courses certainly saves the state money in these austere times. But the hunter safety, outdoors skills and wildlife knowledge they pass along is even more valuable."

The nine volunteers and their hometowns are:

District 1: Terry Boyce, Elizabeth City, Pasquotank County

District 2: Doyt "Dutch" Akom, Newport, Carteret County

District 3: Joe Fabian, Wilson, Wilson County

District 4: Joe Darden, Fayetteville, Cumberland County

District 5: Dave Gibbs, Hurdle Mills, Orange County

District 6: Anne-Marie Rushing, Wing Union County

District 7: Jay Hutchens, Mocksville, Davie County

District 8: Link Grass, Denver, Lincoln

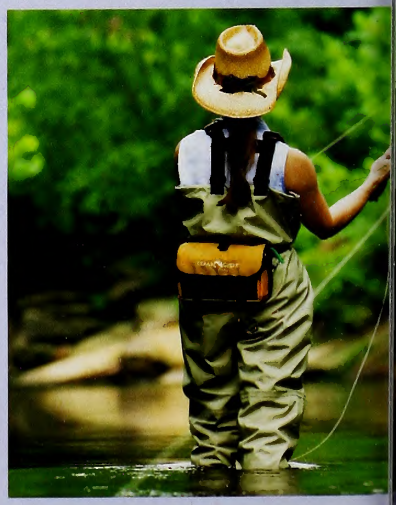
District 9: Bill McAlhaney, Fletcher, Henderson County

"The real unsung heroes of our i are the instructors whose tireless eff mote firearms safety, youth shooting and our Second Amendment right Anthony Imperato, president of the Repeating Arms, who made the con orative rifles possible. "I thank the salute them."

The hunter education courses a and include information about hunt and responsibility, conservation and management, firearms, survival and as well as specialty hunting and tr safety. The course is a minimum of and is accepted in every state and pr North America. All first-time licens must successfully complete a hunter course before they can hunt in North or purchase a hunting license.

To learn more or to enroll in a fr education course, go to www.ncwil Hunting/H_Hunter_Ed_Course.l schedules and locations near you (919) 707-0031 for more informatio

Pisgah Fly Masters



The fourth annual Pisgah Fly Masters fly-fishing tournament is rapidly approaching, with a growing field of entrants ready for competition on March 19–20.

A casting competition on March 19 at the Pisgah Center for Wildlife Education determines the field in three categories for the catch-and-release trout fishing finals, to be held March 20 along a private stretch of the Davidson River.

All money raised will go toward programming at the Pisgah Center for Wildlife Education, an N.C. Wildlife Resources Commission regional learning and visitor facility located near Brevard.

Entry fees are $30 for youth (ages 10 to 15); $50 for anglers 16 and older; and $50 for the professional level. For rules, a priz entry forms, go to www.ncwildlife.org/pisgahflymasters/ or call (828) 877-4423.

The Wildlife Endowment Fund

An Investment for the Future

Established in 1981, the Wildlife Endowment Fund allows the Wildlife Resources Commission to accept tax-deductible contributions for wildlife conservation. Money from the sale of lifetime licenses is also placed in this fund. Your donation or purchase will ensure that North Carolina will have a rich wildlife heritage for generations to come.

Lifetime License Form

Infant and Youth *(check appropriate block)*:

- ☐ Sportsman Infant $200
  (under 1 year old—Application must be received before applicant has attained 1 year of age.)
- ☐ Unified Sportsman/Coastal Recreational Fishing Infant $275
  (under 1 year old—Application must be received before applicant has attained 1 year of age.)
- ☐ Sportsman Youth $350
  (ages 1 through 11—Application must be received before applicant has attained 12 years of age.)
- ☐ Unified Sportsman/Coastal Recreational Fishing Youth $450
  (ages 1 through 11—Application must be received before applicant has attained 12 years of age.)

A copy of the birth certificate must accompany applications for infant and youth licenses. Birth certificate documentation cannot be returned.

Note: Pending satisfactory completion of the hunter safety course, persons who possess infant or youth licenses may exercise the privileges thereof when accompanied by an adult who is properly licensed to hunt in North Carolina. "Accompanied" is defined as maintaining a proximity to the hunter which enables the adult to monitor the activities of, and communicate with, the hunter at all times.

Adult (age 12 or older) *(check appropriate block)*:

- ☐ Comprehensive Inland Fishing. $250
  (N.C. residents only—includes basic inland fishing, trout & trout waters on game lands)
- ☐ Comprehensive Hunting. $250
  (N.C. residents only—includes basic hunting, big game, game lands & N.C. waterfowl)
- ☐ Sportsman. $500
  (N.C. residents only age 12 or older—includes basic hunting & inland fishing, big game, game lands, trout & N.C. waterfowl)
- ☐ Coastal Recreational Fishing $250
  (N.C. residents only—includes coastal recreational fishing)
- ☐ Unified Sportsman/Coastal Recreational Fishing $675
  (N.C. residents only—includes same privileges as the Sportsman, plus coastal recreational fishing)

A federal waterfowl stamp must be purchased separately for all N.C. hunting licenses.

Note: On or after July 1, 1991, a person, regardless of age, may not procure a hunting license or hunt in North Carolina without producing a certificate of competency for completing the hunter safety course or a hunting license effective prior to July 1, 1991, or by signing the statement below that he or she had such a license.

Check appropriate block and attach required copy:

- ☐ Copy of Prior Year Hunting License
- ☐ Copy of Hunter Safety Certificate of Competence
- ☐ In lieu of copy, I am signing the statement below:

Statement: I certify that I was a licensed hunter prior to July 1, 1991.

Signature _____ Date _____

Visit us online at www.ncwildlife.org or call 1-888-248-6834 for a complete list of lifetime licenses, including those for nonresidents and 65 and older.

Lifetime License

Complete the following information if applying for a lifetime license. Be sure to check appropriate block(s) on reverse side *(please print legibly)*:

Name of Applicant _____

Daytime Phone _____

Mailing Address _____

Resident Address _____

County _____ Date of Birth _____ Driver License # _____

E-mail Address _____

Is this license a gift? ☐ Yes ☐ No If yes, mail license to ☐ Donor or ☐ Applicant.

License Donor's Name *(if applicable)* _____

Donor's Telephone # _____

Donor's Mailing Address _____

City _____ State _____ Zip _____

Method of Payment: ☐ Check ☐ VISA ☐ MasterCard

Acct. # _____ Expires _____

Print name exactly as it appears on credit card _____

Cardholder's Signature _____ Date _____

Personalize your Lifetime License for an additional $5:
Indicate your selection of letters, numbers, dashes, periods, commas and /or blanks up to 6 spaces: ___ ___ ___ ___ ___ ___

Indicate your personal message including letters, numbers, dashes, periods, commas and /or blanks up to 21 spaces:

___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
___ ___ ___ ___ ___ ___ ___ ___ ___ ___

Signature of Applicant or Donor _____ Date _____

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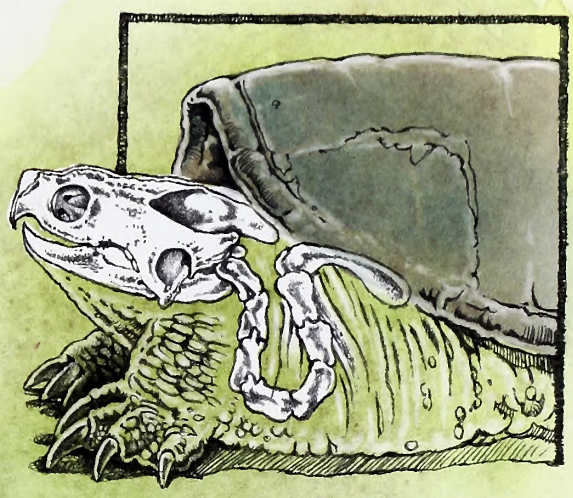
ow Do Slow Snapping Turtles atch Swift Fish?

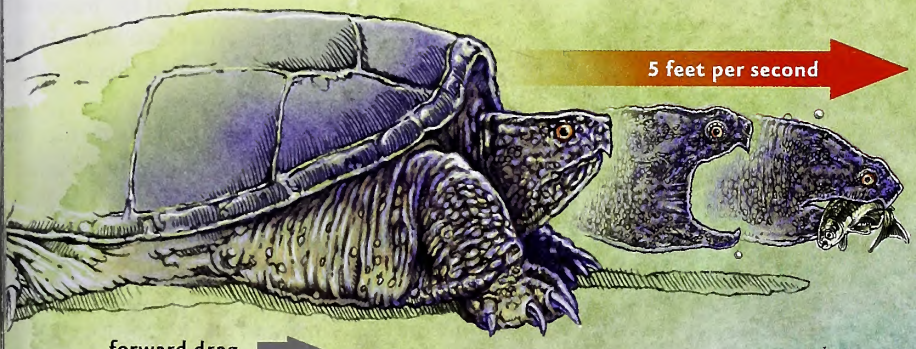
en by Clyde Sorenson
rated by Jim Brown

ILE SNAPPING TURTLES have a well-deserved reputation for rding anything vaguely organic as food, fish and other aquatic animals e up the bulk of their actual diets. Snappers either lie in wait for prey, ey slowly stalk within striking distance, but once prey is in range ally within 2 inches), they move with lightning speed.

The snapping turtle's neck skeleton and muscles are constructed to allow the animal to rapidly launch its head forward. The turtle's head travels at a speed of about 5 feet a second, almost as fast as a rattlesnake's strike. The head actually moves only about 1½ to 2 inches, however.



COMMON SNAPPING TURTLE



The turtle's mouth opens as the head thrusts forward, reaching maximum gape just before it reaches the prey. Once the neck reaches maximum extension, the jaws snap closed in about 50 milliseconds — about one-tenth of a blink of an eye. The recoil of the strike created by flinging the head so forcefully forward actually drags the turtle's body forward a bit.

orward movement of the turtle's head should push a on of water ahead of it, displacing the prey out of . The turtle compensates for this by letting the water e its mouth and the upper part of the throat as the moves forward. After the prey is captured, this is expelled through the partially opened jaws.

Delusional Interludes

written by Jim Dean

ILLUSTRATION BY JACKIE PITTMAN

Early one spring morning in the '70s, Tom Cooper and I hiked down the steep Yellowbuck trail into North Harper Creek, then followed that tributary downstream several miles to begin fishing below the high falls on the main stem of Big Harper. It was a handsome day filled with promise.

We separated a few hundred yards, and began to cast our flies on the sun-dappled currents, leap-frogging each other as we fished upstream. Wild rainbow and brown trout rose steadily to our hair-wing Royal Wulff dry flies. After we fished the big pool under the thundering falls, we climbed up through the thick rhododendron to get on the trail that would carry us above the falls.

"Looks like we've got it all to ourselves," I said as we stopped to rest a few minutes.

We sat on a log, savoring the delicious moment, happy to be sharing the glorious obsession that formed the bedrock of our friendship. "Uh oh, I hear somebody coming," Tom noted.

"She was fascinating and boldly adventurous with many interests that we shared."

A young girl approached wearing a backpack and carrying a walking stick. Our first reaction was relief to see no fishing gear, but that was quickly replaced by the observation that she was no more than about 5 feet tall, elfin, dark-haired and extraordinarily cute. Nor did she seem at all fearful to encounter two grungy males in the wilderness.

The three of us talked a long time, and she told us that she was a student at N.C. State—Tom's recent alma mater—where she was majoring in fine arts and horticulture. Further, she had come alone to see the big falls, and she was planning to camp somewhere downstream. She was fascinating and boldly adventurous with many interests that we shared.

We told her that we had a tiny cabin on the hill overlooking Wilson Creek behind Archie Coffey's store in Edgemont, and that we came up often to fish. We described the cabin with its wood stove, tiny 1940s refrigerator and sink with piped-in spring water. Sounds wonderful, she said. And, it just so happened that we were planning to cook a magnificent pasta that evening and open a good bottle of wine. And would she like to join us for supper? She said she might like that.

I was certainly intrigued, if not utterly be-smit, but the day was getting along and we had trout to catch and miles to walk. We bid a friendly goodbye and wish her well, then Tom and I headed back to the water.

By late afternoon, we had fished up the main ste and into North Harper not far below the goat-killi climb out Yellowbuck trail to the car. The fishing h been exceptional, although most of the trout we cau were typically small; perhaps only one or two were long as 10 inches.

Back at the cabin, we tossed off our gear and ha beer to cool off while sitting on the front porch. Lo shadows stretched across the road, shading some Wilson Creek's pools. Ordinarily, we would be head out there to fish, but not this evening.

I began to cut up mushrooms and homegrown tomatoes for the pasta, and got the other ingredien ready. Then I warmed a kettle of water and took it on the porch to wash up. I trimmed the moustache I had at the time, and put on a clean shirt. When came back inside, Tom had changed his clothes an was brushing his teeth.

I dug the bottle of wine out of my duffle, and decided to open it to let it breathe. When I came b into the kitchen, Tom had poured hot water into t sink and was shaving. Shaving!

Nothing was said about all this unusual activity Refreshed, we sat on the porch and drank another b but just one. The shadows had long since envelope the creek, and the first lightning bugs appeared. Yel Sally stoneflies were almost certainly on the water fishing would be prime.

Tom fiddled with his fly boxes and I checked o the pockets of my vest, finding an ancient moldy li wurst and cheese sandwich from a previous trip. looked longingly at the creek, now nearly lost in t gloaming. I could smell Old Spice.

Tom began to snicker. "You dang fool," he sai "getting all that food ready and washing up and p ting on a clean shirt. Your face is scrubbed pink!"

"Yeah, and look who's talking," I shot back, lau ing. "I didn't know you even owned a toothbrush and when have you ever combed that privet hedg you call hair?"

"Letting wine breathe, for heaven's sake," To snorted disgustedly. "It ought to be hyperventilati by now. Let's eat."

This all happened BC (Before Connie), who became Tom's wonderful wife a few years later. A for our Harper Creek enchantress, it's fair to say t among her many charming attributes, you could a good judgment.

TODD PUSSER

Carolina chickadee

OUTDOOR MOMENT

IN THE APRIL ISSUE

TODD PUSSER

DON'T TREAD ON ME

Copperheads are the most common source of North Carolina snakebites. Here's how to avoid them and their venomous cousins.

TROUT IN THE CITY

Good trout fishing doesn't always require a backcountry trek. Sometimes you can fish just steps away from city streets and buildings.

TURKEY TIPS

Often the best hunting guidance you can receive is a list of things to avoid doing, most of them involving typical human impatience.

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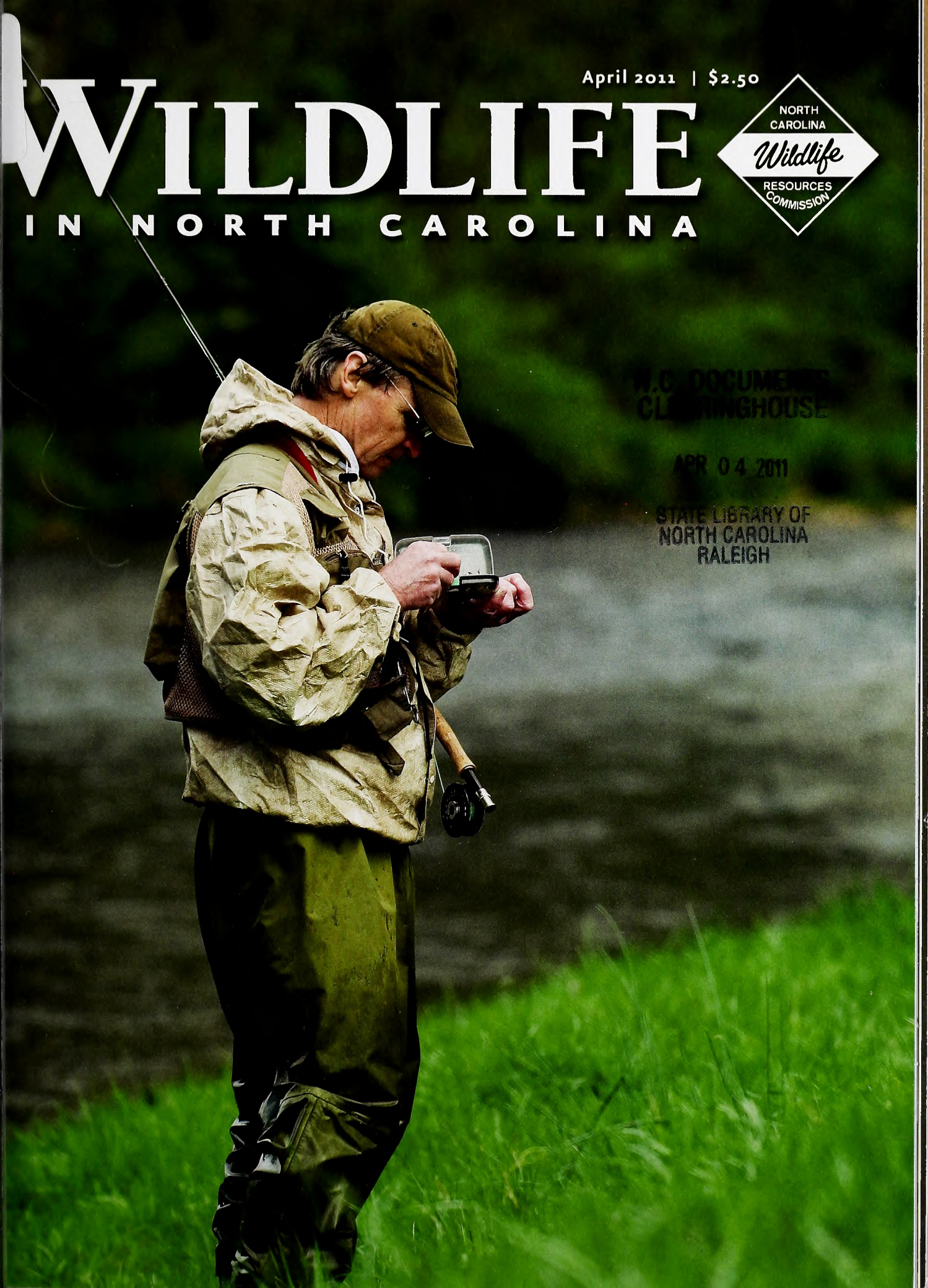

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Copperheads live in all 100 counties of our state, and they are masterfully camouflaged. Avoid an unpleasant encounter with one by wearing shoes in your outdoor rambles.

PHOTOGRAPH BY TODD PUSSER.

Volume 75 | Number 4

WILDLIFE IN NORTH CAROLINA

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Cover: Great trout angling is available within numerous Mountain towns, eliminating the need for a long walk to a fishing site. The only difficulty remains finding which fly the fish are biting. PHOTOGRAPH BY CHIP LAUGHTON.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

Jim Wilson appeared in my office door, grinning. "In the late 1870s, the federal government stocked 45 million Chinook salmon east of the Mississippi," Jim said. "The Chinooks matured, ran to the sea and disappeared, never to be seen again."

CHIP LAUGHTON

That tidbit was one of the many interesting, wacky and just plain weird facts Jim shared as he was researching and writing his three-part series on fish propagation in North Carolina. The series begins this month with "Cheaper To Buy Bacon" on page 20. During the process, he dug through hundreds of pages of historical documents that, despite their availability online, had likely been read by no one else for decades. In doing so, Jim arguably made himself the preeminent expert on our state's hatchery history.

While Jim might find that a dubious title, he would acknowledge that it is important to look back at the way people attempted to manage fish and wildlife long ago. If we can analyze what actions they took, and what succeeded and failed, we can apply those lessons to modern fish and wildlife management.

Although Chinook salmon did not survive in North Carolina's waters, non-native rainbow trout and brown trout flourished. Today, it is possible to find great trout fishing in thousands of miles of cold Mountain streams. And largely due to careful fisheries management, anglers can even find nice trout within the city limits of many towns. Marty Shaffner explains in "Urban Trout" (page 16) how to locate and catch trout in these urban settings. No hike necessary, just park and cast.

Wise wildlife management has led to another outstanding opportunity in our state —wild turkey hunting. Clyde Sorenson, a longtime contributor and friend of the magazine, has done quite a bit of turkey hunting, and he has the feathers to prove it. But as he admits in "How Not to Kill A Turkey" (page 10), he has also done a fair amount of unsuccessful turkey hunting. If you enjoy this difficult pastime and have tended toward the unsuccessful, I hope that Clyde's travails and lessons learned will help you succeed this spring.

Enjoy your time afield, whether it's pursuing trout, hunting turkeys or watching butterflies ("Swallowtails, Snakeroots and Slimy Horns," page 28). And if you happen across any remnant Chinook salmon, please let Jim know.

Greg Jenkins

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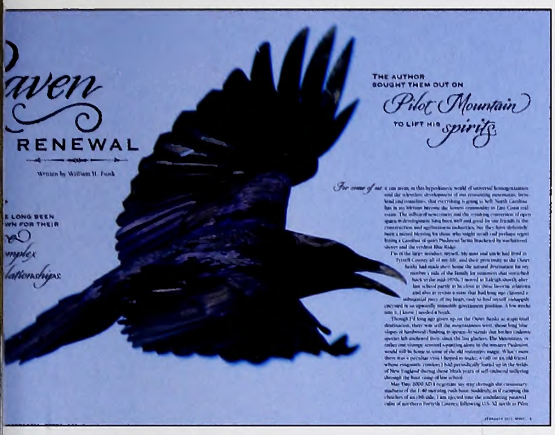

vk!

newal" (Feb. 2011) brought back
of an occurrence that took place on
chian Trail many years ago. My friend
loafing near Charlies Bunion when
a flock of five ravens playing in the
nts coming up the face of the bunion.
gliding and chasing each other.
ly, another raven joined the group.
ad a stick clutched in its claws.
y up high and drop the stick, and
avens would chase it until one of
ht it. They repeated the game over

e fascinated by this behavior. We
atching them, and the memory has
/ mind through the years.

Rich Bankston
Franklin

nk's admiration of ravens and their
butes is seconded by my friend
st year, while on a camping trip to
h Park, we had the experience of a
om a vista high up on Skyline Drive,
d as five ravens soared, nose-dived,
appeared to play tag. Their aerial
k them up hundreds of feet and
ickly it was hard to keep up. Funk
ht — the raven is a smart, social,
animal.

David Bracey
Greensboro

The article on ravens brought back many memories. For part of my childhood, we lived a mile down the road under the peak of Little Sandy Mush Bald, which had a set of cliffs named The Raven Cliff. We would frequently hear the *Awk! Awk! Awk!* from the skies. My mother, as if it were some special religious experience, would shout, "Look for the ravens!" Then it became a game. We would stop whatever we were doing, and start searching the skies near the Big Bald of the Raven Cliff near the Little Bald. The first one to locate the ravens would point in the direction of these magnificent birds as they soared around these peaks and shout, "There they are!" Thank you for allowing me to relive some special childhood memories.

Lloyd Fish
Franklin

Upon reading William A. Funk's article "Raven Renewal," I was enlightened about his experience observing a few of the habits of these amazing black birds. In the same issue, in Nature's Ways, Clyde Sorenson tried to show how intelligent ravens are and seems to suggest that if evolutionary pressures were greater, these birds "most assuredly would figure out how to speak." I find that statement to be a tad uninformed.

Some may say that some animals seem to have a language of their own and communicate with each other. Some animals, even birds, as Sorenson attempts to show, have brains large enough that allows them to make tools. But is this actually true?

It is well documented that the use of language is unique to humans. No other creature on this planet has this intellectual cognitive capacity. I could point at an object and do a little dance but would you understand what I was trying to express? If I was a raven, I could get along and cooperate well enough with my fellow creatures to help prolong our mutual existence, but I could not express any thought or idea beyond basic survival instincts. The ability to share thoughts requires a well-developed language.

Although educated in science, I am a simple man who enjoys nature and wildlife as much as anyone. I would like to ask Sorenson to kindly show me how a bird, such as the raven can possibly "figure out how to speak" through a greater "number of adaptations and evolutionary pressures." I say that it's logically impossible. A bird cannot "make tools," nor can any of them speak, even in a tribal language unknown to humans. Never could, never will.

Dennis C. Neill
Beaufort

***Greg Jenkins:** It is a fact that ravens make tools. Watch this video: tinyurl.com/6am883v. A deep base of ethological literature documents that species including wolves, chimpanzees and, yes, ravens, can communicate sophisticated, even abstract, ideas through vocalizations. These creatures might not speak in languages comprehensible to us, but they do elegantly communicate.*

No Competition

Upon receiving the new issue, it's a flip of a coin whether my first read is Jim Dean's Our Natural Heritage column or Greg Jenkins' Editor's Note. Jim's column won the coin toss in February 2011. A good call, since 14 of my 31 years assisting landowners with natural resource conservation was spent west of the Rockies. Coyote challenges are a constant in the western United States.

The Editor's Note led me to two great articles — William Funk's "Raven Renewal" and Shari Smith's "Still Walker." Those two articles provided much food for thought. However, the last two sentences in the Editor's Note says it all: "It just goes to show that although we might search from the time we are children until our release back into dust, our quest never comes to an end. It is a journey in which we find what we search for again and again, and after we are gone, we hope to hand off a similar quest to the next generation."

Frank Holt
Asheville

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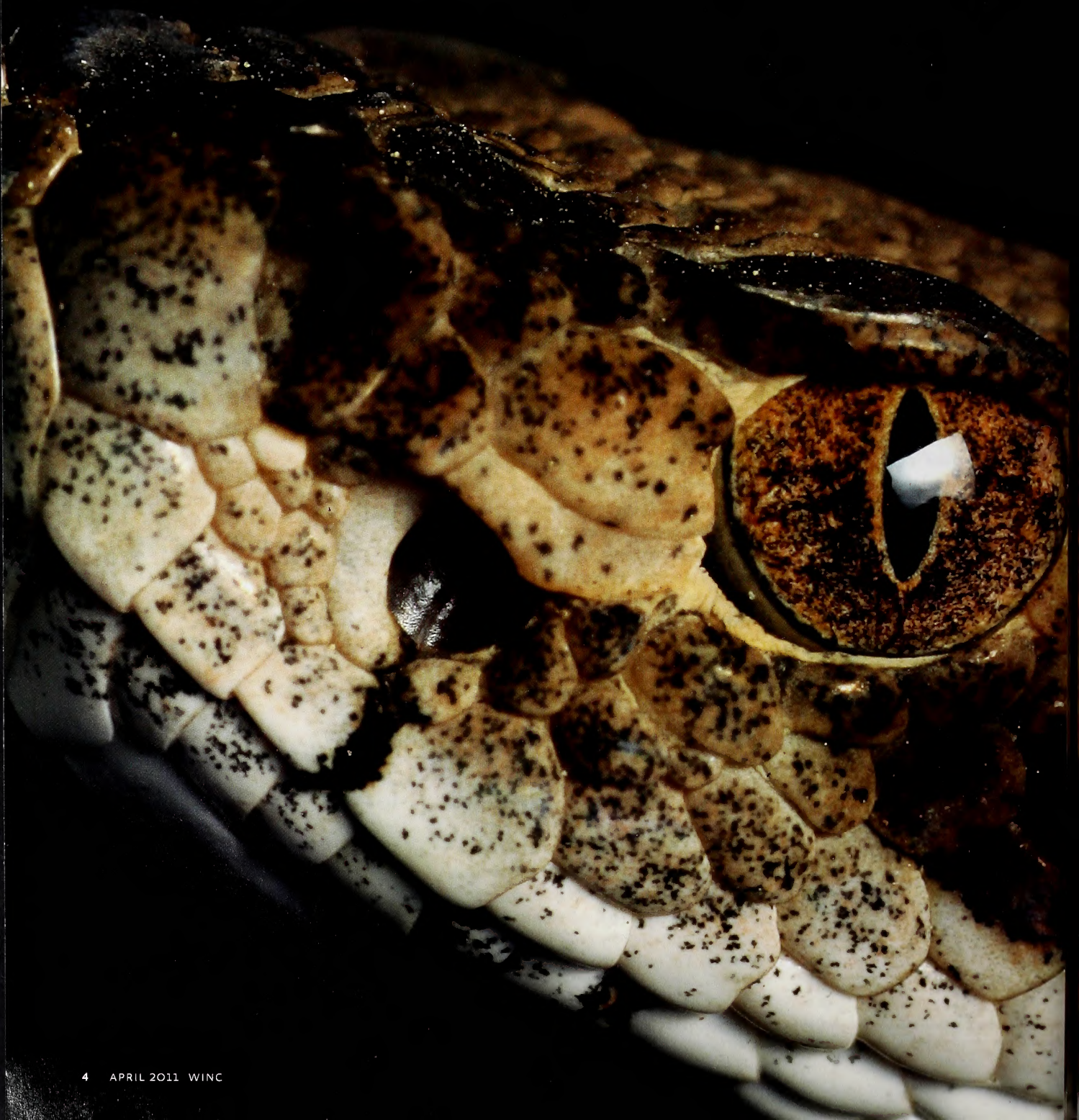
BEWARE

THE VIPER NEXT DOOR



It's true—North Carolina is close to the top of the charts in snakebites. **BUT DON'T FEAR** our no-shouldered friends, just take simple steps to avoid unwanted contact.

WRITTEN BY **JAY BARNES** PHOTOGRAPHED BY **TODD PUSSER**

It had been a perfect summer Saturday. You were met by a pot of coffee at 8:15, and by 9:30 you'd finished cutting the grass. After a few hours on your boat with the kids, you were back home and all cleaned up by 4:30. Friends stopped over for drinks and grilled steaks, and by 9:30 they'd all gone home. As you were about to end the day and head off to bed, you made one last trip into the back yard to cover the grill and roll it over beside the garage.

It was then, at 10:17 p.m., that your day became truly memorable. As you turned the corner behind the house, you felt the swift stab of what you thought was a sharp stick on your bare heel. You jumped forward and spun around, studying the ground behind you in the dim light. And there you could plainly see that it wasn't a stick that poked you after all, but a 2-foot-long copperhead slithering away into the darkness. Just after 11 you arrived at the nearby emergency room, and by then throbbing pain was radiating up your leg. At 12:20 they began your first antivenom IV, and it was sometime after 4 a.m. that you finally got to sleep. You didn't return home until Tuesday—three days later.

TIMBER RATTLESNAKE *Crotalus horridus*

This backyard encounter may be fictional, but it's not unlike those of dozens of Tar Heel residents bitten by snakes every year. North Carolina is home to six venomous species, including the coral snake, copperhead, cottonmouth and three varieties of rattlesnakes: Eastern diamondback, timber and pigmy. The pervasive copperhead is most often the culprit, and victims are commonly struck in their own yards. Copperhead bites are on the rise in North Carolina, with the greatest increase in urban areas where new development has pushed into forest habitat. Copperheads have adapted well across the state, from the high elevations of the Smoky Mountains to the barrier islands of the coast —in fact, they're found in all 100 counties. And if you ask around, you'll find that most everyone knows someone who's been bitten.

Just ask Janet Furman, bitten on her pinkie toe while walking her dog in Chapel Hill in July 2010. Or ask Matt Jenkins, who was running barefoot across North Carolina that same summer to raise money for charity when he was bitten on the foot in Franklin, near the Tennessee line. Then there are Susan and Fred Mezias of Jacksonville, whose story speaks to both the camouflage and the prevalence of copperheads across the state.

"I absolutely did not see that snake at all," recalls Susan Mezias, referring to her 2006 backyard encounter. "It was a shady area with lots of pine straw, a perfect place for him to hide."

After she was bitten on the heel, her husband quickly captured the snake in a bucket in case doctors needed to see it (neither necessary nor recommended). Upon her arrival at the local emergency room, her pain became intense. She was admitted and received numerous vials of antivenom. Mezias remained hospitalized for three days and soon discovered how costly her bite had been.

"They gave me a bill for $41,000, and I thought they put the zeroes in the wrong place," she recalls. Her husband framed the bill along with the dried skin of the snake and presented it to her for her 50th birthday.

Two years later, almost to the day, Fred Mezias also was bitten at the couple's Jacksonville home. While raking his yard, Mezias reached down to scoop leaves and was bitten on the finger by another well-hidden copperhead. His bite left him with an even longer hospital stay, a $38,000 bill, numbness in his finger that still persists, and a valuable lesson for everyone who hears his story.

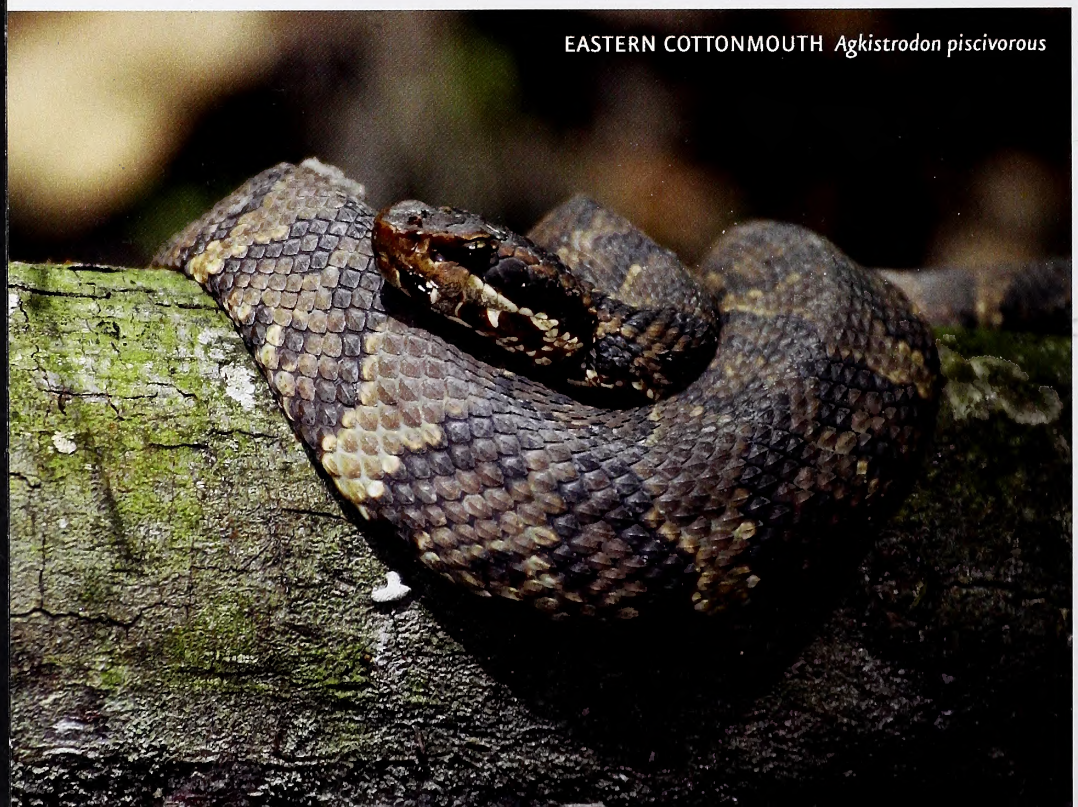
"They're everywhere. Now I keep
rain boots by the door. I wear them ev
I go outside," says Mezias.

Recent media reports and nume
Internet sites claim that North Caroli
the nation in snakebites, with an inc
of 19 bites per 100,000 people—not
of news an often snake-phobic publ
to hear. Well, that statistic may be a
blown, though North Carolina tend
the nation in copperhead bites.

The claim dates back to a study
omous snakebites in the United Stat
ducted by Dr. Henry M. Parrish in th
1960s. Parrish and his associates su
more than 5,500 hospitals and almo
physicians across the nation in one
most thorough studies of its kind.
gathered records from 1958 and 195
found that some 6,600 venomous sn
were reported annually. North Caro
the nation with 856 bites in 1959, a
18.79 bites annually per 100,000 p
based on the 1960 census. Arkansas a
followed closely behind. The nationa
was 3.74 bites per 100,000 annually.

Parrish's research showed the ma
bites were on the hands and feet of
under age 20. Males were bitten tw

In North Carolina, **copperhead bites are by far the most common** and, fortunately, the **least dangerous** of the group.



EASTERN COTTONMOUTH *Agkistrodon piscivorous*

EASTERN CORAL *Micrurus fulvius*

females, frequently when they tried
re or otherwise handle venomous
Other research suggests alcohol can
or in many snakebite incidents.
, the best source for snakebite infor-
night be the American Association
n Control Centers (AAPCC), and in
arolina, the Carolinas Poison Center
n Charlotte. Sixty poison centers
ne nation provide round-the-clock
expertise to physicians and hospitals
nakebite victims. The poison centers'
nclude all reported bites from ven-
nd nonvenomous snakes. They also
the number of envenomations, or
ere venom is injected—as opposed
ites," when venomous snakes bite
enom is delivered. More than a third
rom venomous snakes in the United
e dry bites and don't require anti-
r hospitalization.
08 the AAPCC reported 3,192 snake-
he country, 509 of which occurred in
arolina. With 5.5 bites per 100,000
he Tar Heel State still ranks near the
snake pile along with Texas, Florida,
and Georgia. The national average in
s about one snakebite per 100,000
But calls to the poison centers are vol-
nd it's very likely that some snakebite
never reported to the AAPCC.
ng the same year, the CPC recorded
nations in North Carolina from 233
eads, 15 cottonmouths, 17 rattle-
3 unknown pit vipers (either copper-
ottonmouths or rattlesnakes) and
e snakes kept as pets. No coral snake
re recorded in North Carolina that
n any year for that matter. That's a
ng, since Eastern coral snakes are
elated to cobras and possess virulent
xic venom that can cause paralysis
ratory failure. Coral snake antivenom
n short supply, after the lone FDA-
l manufacturer ceased production in
t coral snakes have become exceed-
e in North Carolina, with only a few
ns spotted in recent years in the
tern corner of the state.
rth Carolina, copperhead bites are by
ost common and, fortunately, the
gerous of the group. Many victims
never require antivenom. Only one recorded copperhead fatality is known to the state, a 1-year-old who died after being bitten on the hand in Wilkes County in June 1960.

Cottonmouth, timber rattlesnake and Eastern diamondback rattlesnake bites are far less common, but all can be life-threatening and should be taken seriously. Timber rattlers can be found across the state and are responsible for about a dozen or more bites each year—often resulting in major tissue damage and treatment costs exceeding $100,000. The Eastern diamondback has become rare in North Carolina but is potentially our most dangerous snake. These heavy-bodied reptiles prefer pine forests of the southeastern counties (the northern limit of their range) and can grow to 6 feet long. They possess longer fangs than other native vipers (up to 20 millimeters) and can deliver larger doses of venom. Encounters with humans are rare, though the CPC reported two North Carolina envenomations in 2006, and one in June 2010—a man bitten in his yard after his dog cornered the snake.

Snake venom is generally classified as hemotoxic (damaging blood and tissue) or neurotoxic (affecting nervous systems). Pit vipers are named for the heat-sensing pits on each side of their heads, which allow them to detect and strike prey animals. They are hemotoxic, though venom from coastal populations of timber rattlers and some Mojave rattlers found in the southwestern United States has been shown to possess neurotoxic properties. Pit viper venom is mostly water but contains powerful proteins, polypeptides and enzymes that cause necrosis (tissue death) and hemolysis (destruction of red blood cells). In North Carolina, victims of venomous snakebites typically experience significant pain, hemorrhagic effects (bleeding) and notable edema (swelling). One victim reported gaining 7 pounds in 12 hours due to fluid retention after being bitten by a cottonmouth. Other common symptoms include nausea, vomiting, blurred vision, severe headache and neck pain that can be comparable to whiplash.

Around the world, many nations suffer large numbers of snakebite fatalities. The World Health Organization estimates that

NATURE'S WAYS

How Do Pit Vipers Inject Their Venom?

See Nature's Ways, page 39.

COPPERHEAD *Agkistrodon contortrix*

LET THEM SLITHER!

From the writings of the Old Testament to Indiana Jones' dilemma in "Raiders of the Lost Ark," snakes have been vilified at almost every turn. Our repulsion has risen to the extent that millions of Americans will openly express their phobia, though very few have ever encountered a snake in the wild. For wildlife biologists and naturalists, this fear presents an extreme challenge: How do you enlighten the snake haters?

"Introducing people to snakes can change fear or loathing into deep interest. I've seen it many times," says Jeff Beane, herpetologist with the N.C. Museum of Natural Sciences. "It can be a slow process, but often that interest can lead to a newfound respect."

With that respect comes an important message: Killing snakes is unwarranted, harmful to ecosystems and often dangerous. Snakes control rodent populations, and the large majority are harmless to humans. They occupy an important niche in a healthy natural environment. So let 'em live!

Here are a few venues where you can learn more and see North Carolina snakes up close:

N.C. Museum of Natural Sciences, Raleigh

N.C. Zoo, Asheboro

N.C. Aquariums, Fort Fisher, Pine Knoll Shores, Roanoke Island

Serpentarium, Wilmington

Western N.C. Nature Center, Asheville

SNAKEBITE SAVVY

1. TEST YOURSELF.
Know how to quickly identify local species such as copperhead, cottonmouth and our three native rattlesnakes.

2. DITCH THE FLIP-FLOPS.
Wear protective shoes or boots even in summer, and even in your own yard.

3. LOOK BEFORE YOU REACH.
Snakes often bite hands placed in holes, crevices or woodpiles, where the reptiles like to hide.

4. LIGHT UP.
Especially in summer, never venture into the night without a good, bright flashlight.

5. FORGET THE OLD FIRST-AID.
Don't even think about stocking the razor blades, suction devices and tourniquets you learned about as a Scout in the 1960s.

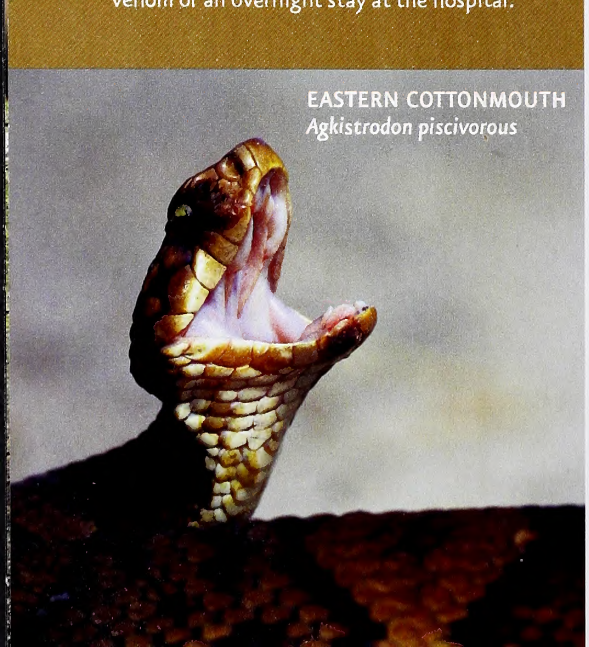
6. LEAVE 'EM ALONE.
Don't try to capture or kill any snake. If you've been bitten, leave the perpetrator alone, but get a good look if you can. Never take a snake to a medical facility.

7. KEEP OTHERS CLEAR.
Know that even after a bite, snakes usually remain within 20 feet of the incident for some time. Move pets, children and others away from the area.

8. HANDS OFF.
Never handle a dead venomous snake. It may still bite with a reflexive response.

9. DRIVE THE SPEED LIMIT.
Your best first-aid device for a venomous snakebite is a set of car keys. But don't panic—unless you're deep in the woods on a wilderness excursion, you should have adequate time to reach medical care.

10. STAY CALM.
(Easy to say, isn't it?) Get checked out at your local emergency room. But know that the majority of snakebites—even from venomous species—do not require antivenom or an overnight stay at the hospital.



EASTERN COTTONMOUTH
Agkistrodon piscivorous

each year 5 million people are bitten worldwide, causing from 90,000 to 125,000 deaths. The vast majority of these are in Asia and Africa, where burgeoning populations encounter some of the most lethal serpents on Earth. Mambas, cobras, kraits and the deadly Russell's viper claim the most lives, especially in countries where medical facilities and antivenom are not readily available. Some estimates suggest parts of Kenya and the Congo may experience as many as 600 snakebites per 100,000 people each year. In India, as many as 80 to 100 snakebite fatalities occur each day.

Rapid access to medical care and antivenom treatment keep mortality rates low in the United States. Though administered to only a fraction of snakebite victims, pit viper antivenom is stocked in hospitals across the nation, including many in North Carolina. First developed by French scientists in 1895 to combat the bite of the Indian cobra, antivenom is made by harvesting antibodies produced by horses, goats or sheep injected with small doses of venom. It wasn't widely available in this country until the early 1930s, but since that time it has dramatically reduced mortality. In the bloodstream, antivenom binds to and neutralizes venom, halting the progression of edema, easing systemic symptoms such as hypotension (low blood pressure), and slowing changes in blood coagulation. It can't reverse local tissue damage but can be lifesaving when used to treat dangerous pit viper envenomations.

Today's modern antivenoms are better tolerated by patients than the horse serums of decades past. CroFab, produced from sheep and licensed by the FDA in 2000, is now the only product approved for use in the United States for treatment of copperhead, cottonmouth and rattlesnake envenomations. It should be administered within six hours of the bite. Considering the cost of about $3,000 per vial, it's not hard to see how treatment of moderate to severe bites with multiple vials could get expensive. But for those who really need it, it's worth the price—literally saving life and limb.

With antivenom now widely available, the number of snakebite deaths in the U.S. has fallen substantially. At the time of Parrish's study in the early '60s, about 14 deaths were reported annually. Today that number has dropped to fewer than three per year—and those are typically victims who do not receive timely treatment. Texas often leads the nation in this grim statistic, largely due to [illegible] gerous and abundant Western diam[illegible] and the great distances between h[illegible]

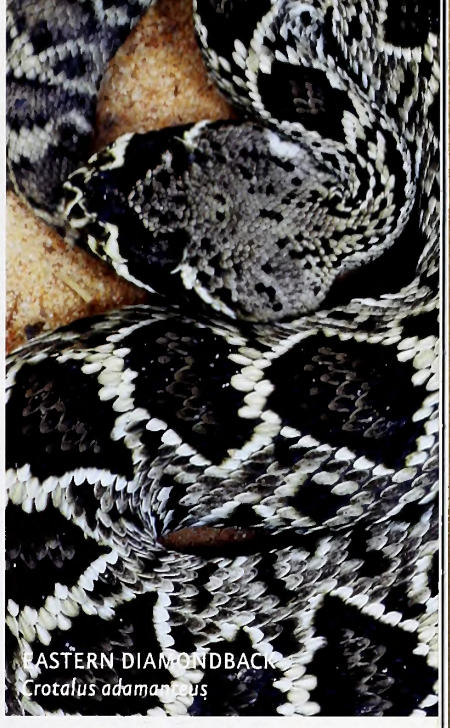
Fatalities in North Carolina are [illegible] mon, but they do occur. According [illegible] "Reptiles of North Carolina," by V[illegible] Palmer and Alvin Braswell, betwe[illegible] and 1977 there were five snakebite [illegible] reported in North Carolina. One [illegible] deaths was a man who refused med[illegible] ment after being bitten by a large ra[illegible] during a religious ceremony. No sn[illegible] deaths were recorded between 1977 a[illegible] but then two were reported in 2005[illegible] Davidson and Bladen counties—bo[illegible] by unknown pit vipers. The follow[illegible] another was recorded in Orange C[illegible] 2008, a McDowell County woman's [illegible] blamed partially on a rattlesnake bi[illegible]

Unfortunately, many victims of v[illegible] snakebites are struck while attemp[illegible] catch or handle the dangerous rep[illegible] Notable among them are members [illegible] remaining holiness and other char[illegible] churches that include snake handlin[illegible] services. Popularized throughout A[illegible] during the early 20th century by Te[illegible] preacher George Went Hensley, sna[illegible] dlers "take up" timber rattlers, cop[illegible] and other dangerous snakes durin[illegible] services, referencing Scriptures fr[illegible] books of Luke and Mark they claim [illegible] the practice. But they're often bitten, [illegible] Hensley himself, who died after a ra[illegible] bite in July 1955 (he'd reportedly be[illegible] more than 400 times). In 1998, ev[illegible] John "Punkin" Brown died after a [illegible] rattler bit him during a service in Ala[illegible] wife had died three years earlier fol[illegible] bite in Kentucky. Another churchgo[illegible] 2006 after a rattlesnake bite also in [illegible]

Kentucky was the first state to p[illegible] against snake handling during relig[illegible] ices. Today, Georgia, Alabama, Ten[illegible] and North Carolina also have laws r[illegible] the use of venomous snakes in pla[illegible] could endanger others. A few rural [illegible] quietly continue the practice, thou[illegible] sionally news reports detail raids [illegible] groups—such as the July 2008 un[illegible] operation that yielded 10 arrests a[illegible] confiscation of 125 venomous snak[illegible] the Full Gospel Tabernacle in Jesu[illegible] in Kentucky.

Others who sometimes fall vic[illegible] snakebites are snake owners, enthus[illegible] trade and keep lethal snakes as pets[illegible]

istrurus miliarius



EASTERN DIAMONDBACK *Crotalus adamanteus*

snakebite deaths were recorded between 1977 and 2004, but then **two were orted in 2005,** in Davidson and Bladen counties—**both caused by unknown pit vipers.**

sibly, managing their collections he necessary safeguards. But do happen, and the stakes are high owing number of hobbyists who keep exotic species. The bite from a namba can be more lethal than that snake, and antivenom for exotic pically is not waiting on the shelves ospitals. When a hobbyist in the ates is bitten by a venomous snake ther side of the world, doctors often ne Venom One unit of Florida's ade Fire Department, which stocks largest collections of antivenom in ry.

y 2008, Teddy Tarrant, age 21, was otos of his Pakistani black snake in ns, S.C., home, when he got too close itten. A member of the cobra family, has a potent neurotoxic venom and ered one of the world's deadliest. as flown by helicopter to Greenville Hospital, but doctors there could ut stabilize him because they did he exotic antivenom needed. With from the curator at the Greenville tors contacted the Venom One d within hours Tarrant was on a Miami.

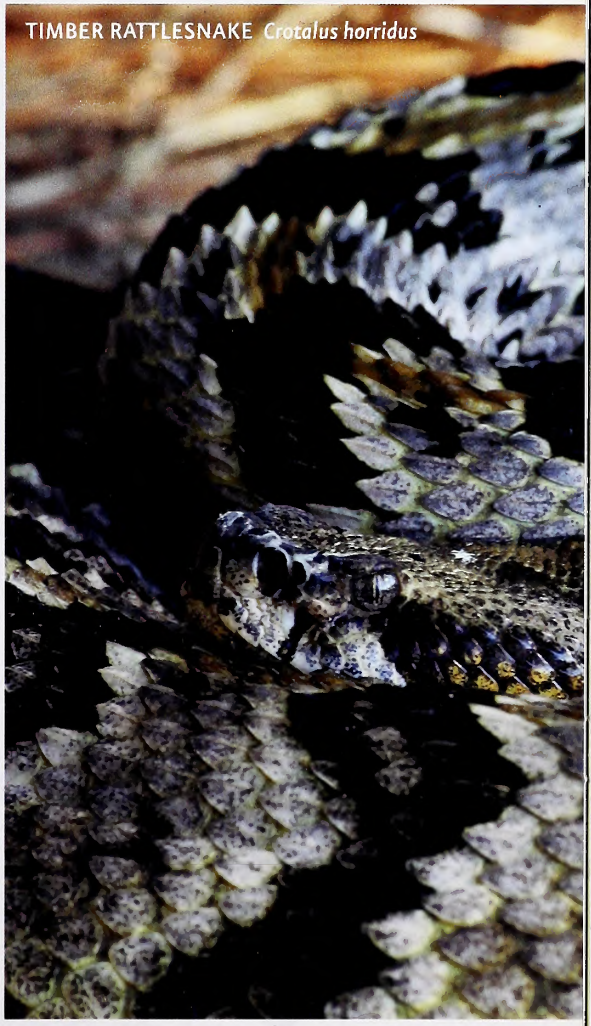
Tarrant arrived at Miami's Kendall Medical Center, he was in bad unconscious, paralyzed and not breathing on his own. After receiving the proper antivenom, Tarrant made an amazing recovery and was sitting up in his hospital room talking with reporters just 24 hours after the incident.

COPPERHEAD *Agkistrodon contortrix*

"I want to keep the snake, but I don't think my wife is going to let me," Tarrant told the Associated Press. At the time, Tarrant's wife was expecting a child.

Most of us needn't be concerned about cobras from Pakistan. We're far more likely to encounter our own homegrown varieties, and it's a good idea to know how to identify each one. Whether we are hunting in the brush or skipping across the front lawn, wearing proper footwear and keeping our eyes peeled can help us avoid having our own snakebite stories to tell. ◆

Jay Barnes is the former director of the N.C. Aquarium at Pine Knoll Shores and the author of "North Carolina's Hurricane History."



TIMBER RATTLESNAKE *Crotalus horridus*

NOT How to Kill a Turkey

The methods of failure are numerous and ruinous, but hunters can learn to avoid these costly mistakes.

My hunting buddy, J.R., and I had been following the bird for at least two and a half hours; over that time, he gobbled at least 200 times. J.R. is a master turkey caller and a master turkey strategist. I think he often knows what a turkey is going to do before the turkey decides to do it.

Unfortunately, he can't always predict what his hunting partners are going to do. After at least half a dozen attempts to head the bird off, 20 or so calling sessions (during which the turkey was an enthusiastic conversationalist but never came to us) and a close call with three jakes that almost ran us over, J.R. had found the magic combination of glass call and creekside setup to finally encourage the wily old gobbler to surreptitiously check out the strange group of hens that had been talking to him all morning.

I saw motion about 60 yards out, through the tangled bottomland of the Chowan County woodlot, and the bird silently eased through the cane and greenbriars over the next couple of minutes. With the gun on my knee, I waited for the gobbler to get in range. He stopped, with his blue-and-red head lit up and exposed in a small opening behind two pine trees, perhaps 45 yards away, and J.R. hissed, "Take him!" But I was unfamiliar with the gun, and it took me an extra second to line up on the bird. In that moment, the head disappeared, along with the delectable breast filets attached to it, and the bird never made another sound. I had found yet another way not to kill a turkey.

Unlike J.R., who hails from northern Louisiana, I did not grow up turkey hunting. In fact, when I was a teenager, even seeing a turkey in the southern Piedmont of North Carolina was an exotic and far-fetched idea. But over the last 30 years, the wild turkey has made an impressive comeback in the nation and in North Carolina, and I have been cursed with turkey hunting fever for at least 25 of those years. The world has, over that time, become crowded with experts who can tell you everything you need to know to hunt turkeys successfully. And while I have managed a few of the grand birds, I am very far from being counted among those savants (just ask J.R.). The fact of the matter, however, is that turkeys are wary, unpredictable quarry, and there is no sure thing in turkey hunting, but there are a number of ways to virtually guarantee that you won't kill a turkey. In these things, I am an expert.

Following is an annotated list of what you should not do, garnered from years of hard-won experience and heartache. This is by no means a complete list. I'll probably figure out new and more creative ways not to get a turkey, but if you avoid these things, your chances of dining on fried wild turkey tenders will definitely go up.

1. Overestimate the vision of the wild turkey. When I first started hunting the big birds, the primary sources of information I could lay my hands on were articles in the big three outdoors magazines. The turkey authorities in these publications all stressed the incredible visual acuity of the wild turkey and cautioned that the birds have an almost supernatural ability to spot a hunter.

I bought in to this to such a degree that on my first solo turkey hunt, after creeping within about 200 yards of a turkey

written by Clyde Sorenson **illustrated by Chris Armstrong**

I knew to be on the roost and calling (poorly) long enough to get the bird to answer e absolutely motionless (I mean absolutely!) for three hours, petrified that the bird m h me, while he flew down and wandered out of earshot with a group of hens. I think th b I got up, my feet and butt had started putting down roots. I learned that day that alth g keys have really, really good vision (see number 2 below), they probably can't see you n half a mile of dense forest. It turns out, they don't have X-ray vision.

Just like you and me, if a turkey is standing in the middle of a sunny field, its pu ls contract to prevent its retinas from being overwhelmed by the glare. If you, the intrep h are tucked back in the deep shadow of a line of red cedars along the field's margin, ju move around with some impunity, so long as you are not backlit and don't move to fa once crawled 200 yards along such a fence line to get in position on a whole flock o ti and then managed to get the birds to turn towards me with a single run of soft yelp

Similarly, a windy day can work to your advantage. Moving vegetation can disgu e movement, again, so long as you go slow and remain as inconspicuous as possible. tl are so unnerved by wind that they often retreat to open fields, which often allows yo to the deep-shadow card described above.

If a turkey is looking at you, DON'T MOVE even a little bit!

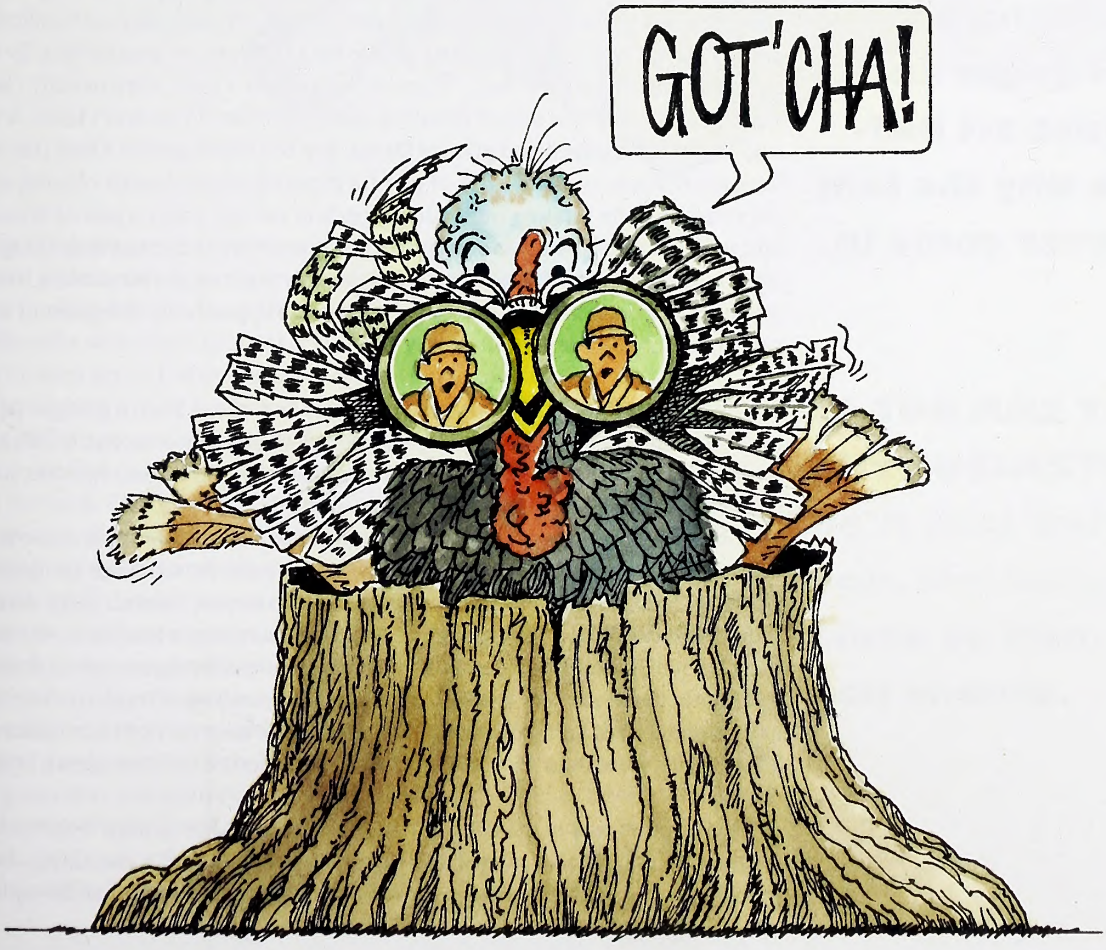
2. Underestimate the vision of the wild turkey. Though they don't have sup na vision, wild turkeys do have very, very good eyesight. Something over half the vol ne turkey's head is occupied by eyeball (more than is taken up by brain), and the birds e (including the ultraviolet spectrum we can't see) and movement extraordinarily we A turkey generally takes the "discretion is the better part of valor" approach regarding yt foreign in its environment, and so its usual response is to put as much distance bet en scary thing and itself as possible, at a running speed of about 20 miles an hour. If a rk looking at you, don't move, even a little bit!

Once, as I sat motionless and fully camouflaged with my back against a large oak d a strutting gobbler approaching 80 yards out, a hen wandered in from the side and pp 3 yards from me. I sat there, staring, as long as I could stand it, but eventually, my de co eyeballs got the better of me. I blinked, she saw it and putted in alarm, and my stru r ished into thin air.

've been calling, and you know the bird is within 70 or 80 yards, assume he is looking
le knows exactly where you are, and he's looking for the "hen" that's been yelling at
ın't begin to count the number of times I've blown a hunt by moving my head to try
oint the bird. Use your ears to help you figure out where he is and move only your
il you see him. Then, you can use his passage behind intervening trees and other veg-
s cover should you need to make minor adjustments to your position. But move delib-
nd only when you're sure there is something solid between you and his eyes.
ast thing in this regard: Don't forget that ultraviolet vision thing. It's never a good idea
anything white into the turkey woods, because there are, after all, white areas on a
nd one should always strive not to resemble a gobbler in the possible presence of other
Beyond that, most modern laundry detergents have brightening agents that make
thing highly reflective to UV wavelengths. Wear something white in the woods, and
ve a glowing "I'm not natural" sign on your person.

I BLINKED, SHE SAW IT and putted in alarm, and my strutter vanished into thin air.

too much. My wife is an incredibly patient and understanding lady, and she gener-
ates the effluvium of my many diverse and sometimes weird hobbies quite well.
, there has been one inviolate rule in our household since its inception: "Thou shalt
tice turkey calls in this residence!" Duck calls are OK, goose calls are OK, my con-
tations of screech owls and barred owls both are OK, but let me make one little yelp
and she's coming after me with the broom. Clearly, around my domicile, any calling
ıch calling.
lso very easy to call too much in the turkey woods. In my early years, I felt compelled
r every gobble with an enthusiastic series of yelps and then would sit baffled as to why
would never come in. Remember, in the turkey world, the ladies go to the gentleman,
ally, the other way around. You are asking that bird to do something against his gen-
re. If you are too enthusiastic, he'll just wait for you, the hen, to come to him, as you
And the more you call, particularly as a novice caller, the more likely you are to make
lly un-turkeylike, and therefore scary (to the gobbler), noise.



That being said, a corollary to the "calling too much rule" is the "calling too loud Most of the time, unless it is very windy or you know where a bird is and he is quite way away, you do not need to be particularly loud. A tom turkey in the spring is k one particular suite of sounds—the various seductive noises hens in the mood n you can hear him, he almost certainly can hear you, even when you make very mut

4. Start calling before you're ready. About three years ago, my buddy Tomm worked a bird for about 45 minutes or so at first light, only to have him wander off so often do, with a wad of hens. So we got up and started slipping through the wood to elicit a gobble from another tom. We eased along an ancient logging path on the hardwood ridge, stopping periodically to sound off on a crow call and then, if no one make a few soft yelps. At one such stop, Tommy's series of soft yelps elicited the pr thunderous gobble, from a bird that couldn't have been more than 70 or so yards aw

Tommy, being the forward-thinking and experienced fellow that he is, had stopp at the base of a large tree, and he simply slid down to the ground with his back to ready to shoot if given the chance. I, however, having already conceded in my mind creeping through the woods game was a very low-percentage option, had just stopp middle of the logging trail, with nothing to offer me cover. So I basically just floppe ground as quickly and quietly as possible, assuming a very uncomfortable, but low prone shooting position.

Tommy waited a few moments and yelped softly once more, and in what seemed a few seconds, a huge tom ambled up the hill, accompanied by a second and then a th bler. Tommy couldn't shoot without shooting over my back, and I couldn't move because the closest of the three was quickly closing on me, all the while staring inten He eventually passed, head glowing red and blue, only about 4 yards from where I l ground, and then all three vanished over a slight knoll in the woods. Don't make a turkeylike sound unless you've figured out your game plan.

It is also very easy to CALL TOO MUCH in the turkey woods. In my early years, I felt compelled to answer every gobble with an enthusiastic series of yelps and then would sit baffled as to why the tom would never come in.

5. Give up too quickly. Gobblers usually call vigorously while they are still in t starting a little before "legal twilight," the half-hour-before-sunrise benchmark duc are so familiar with. They typically gobble for a half hour or so after they fly down, w assemble and breed their hens. Then, at least where I hunt, they usually clam up fo the rest of the day. It is very difficult to work a gobbler if you don't know where he i easy to get discouraged and give up for the day. But a bird seen is a bird that might be have learned, over several years of painful experience and dozens of bumped gobble pays never to stop hunting until you get back to the car. Carry a pair of binoculars wi and use them frequently as you move, not just when you're moving along a field e deep in the woods, too. If you move deliberately and use the binoculars frequently, often spy a bird before he sees you, giving you the opportunity to figure out a plan an get him to move to you.

6. Try to take him too far or let him get too close. So, I'm going to admit it. I'v turkeys—several over the last couple of decades (this is no surprise to folks who hav with me). Far worse, I've crippled two birds as well. The second episode, just two y almost made me give up turkey hunting.

It is important that you know your firearm and its capabilities, because fortune, o tune, is going to throw enough obstacles in your path. Pattern your shotgun at sever with the loads that you intend to use, and then make sure you can judge distance. Ma self familiar with how big (actually, how small) a turkey's head is at 45 yards. You must be dense enough at your maximum range to ensure that at least a dozen or mo will hit the head and neck vertebrae of the bird. In spite of modern, 3½-inch turk extra tight chokes and glow-dot sights, most of us have no right nor reason to atte a bird that's more than 45 yards or so away. The chances of a marginal, crippling hi too high.

On the other side of the coin, although letting a bird get within 3 or 4 yards is exh trying to kill one at that range can be a dicey proposition. For one thing, the closer more likely he is to see something scary, causing him to engage that 20-mph speed p

ying to hit a turkey head at 3 yards is sort of like trying to hit a moving golf ball with olf ball. Your pattern, through a turkey choke, is only a few inches across at extremely ge, so you'll either take his head off if you hit him, or miss him altogether. It's far olan to take your shot when the bird is 20 to 30 yards out, where your pattern will a chance to open up and where he's less likely to get wise to you.

shoot a moving bird if there is any way to avoid it. Both birds I crippled were moving, et pulling both triggers to this day. Wait for him to stop, or make a soft putt to stop lly, take him when he's in an alert posture, head high, and aim for where the feathers e base of his neck. This gives you the maximum kill zone and the biggest target.

ct of the matter is that most turkey hunts for most of us end up without a turkey being e are, after all, up against a couple million years of selection for the sharpest-eyed, nd spookiest birds. Even if you do everything right, and make none of the errors I above (or the countless others you could make), something will happen that will care the bird a long way outside that magical 45-yard mark.

oy where you are. Appreciate the crispness of the morning (because it soon will be n at daybreak), the dawn chorus of the songbirds, the possibility of a chance encounter ch of morel mushrooms and the chance to watch the woods go from brown and riotous green over the course of the season. Maybe in the end, killing a turkey is ccasional icing on a really sweet cake. ◆

IF YOU ARE TOO ENTHUSIASTIC, he'll just wait for you, the hen, to come to him, as you should.

University professor Clyde Sorenson is a regular contributor to WINC.

URBAN TROUT

SCENERY AND HIKING ARE GREAT, BUT WHEN YOU WANT TO FISH FOR TROUT AND YOU DON'T HAVE TIME FOR AN EXCURSION, TRY FISHING IN THE CITY LIMITS.

Written by MARTY SHAFFNER Photographed by CHIP LAUGHTON

A sales representative for several major fly-fishing companies called me one summer morning from a nearby town. He wanted to know if there was anywhere we could wet a line for a few hours. Previously, I had invited him to do a float trip for smallmouth bass, but his time was too limited on this day. I told him that he was in luck because I knew of a stream that ran right through town that we could fish.

We pulled off the road across from a convenience store and parked along a small stream that ran through a small meadow alongside a major highway. The gentleman looked skeptical, to say the least. I smiled and told him to trust me, we were going to catch fish. We walked upstream a bit and got in the water. I waded as quietly and cautiously as possible, approaching a nice run where the water had undercut the bank. It was lined with overhanging grass that draped onto the water's surface. The water deepened as it progressed down the bank, making a nice haven for trout.

My first cast was about 4 inches away from where the grass met the water, and floated undisturbed down the run. On the next cast I plopped the beetle pattern down, actually brushing the grass. The fly didn't float 8 inches before the water boiled and I was hooked up with a chunky brown trout. I leaned the rod away from the grass, led the trout into the middle of the stream and shortly brought it to hand. For a few seconds we admired the trout, which was about 11 inches long—a nice fish for any small stream. Its beautiful golden sides were accented bright red and black spots that glo the sun. I carefully unhooked the fi released it into the water, and the tr quickly back under the relative safe overhanging grass.

In the next run, my friend caugh rainbow about 8 inches long that w beautiful as any fish you would cat stream that required a 3-mile hike. tinued to fish for a couple of hours, some new fly rods, and caught seve fish. As we got out of the water and to walk back to the car, my friend lo around at the several houses and bu within sight of the stream, as well as flying down the highway, and said, believe this stream is this good!"

ıbout Town

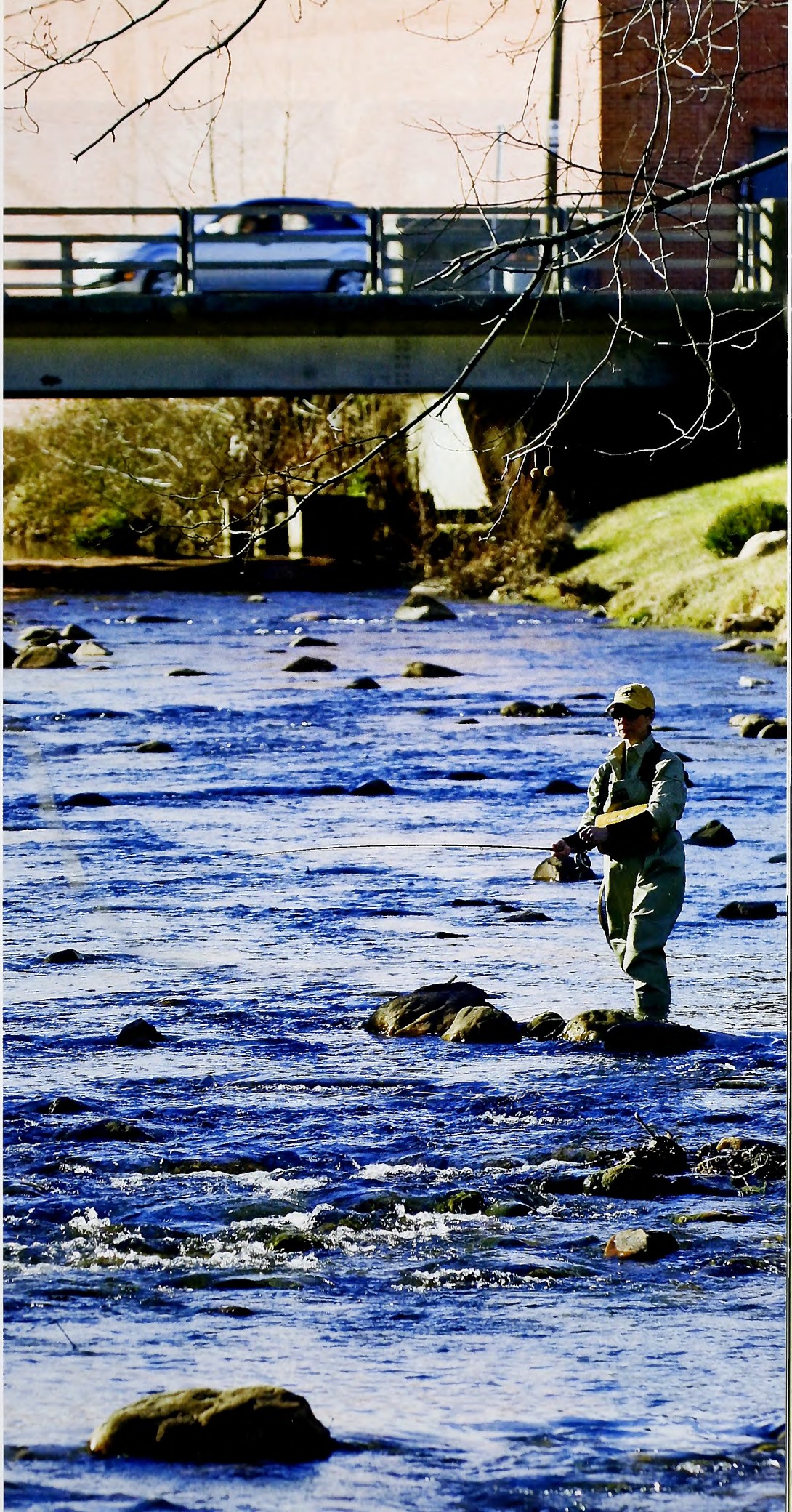
vhen one thinks of angling for trout, mountain streams miles from the oad come to mind—or at least a ınning along a country road far from or town. But some of the best trout ve experienced has been within, or ide, the city limits of numerous towns ut the Southeast, including many eams in North Carolina. I have caught ırban settings such as city parks, 's and golf courses, as well as along- ıerous major North Carolina high- even in front of two different amuse- ks. I love fishing secluded mountain ıs much as anyone else, but I like fish enough that I have no problem g beautiful scenery in exchange for my fishing rod.

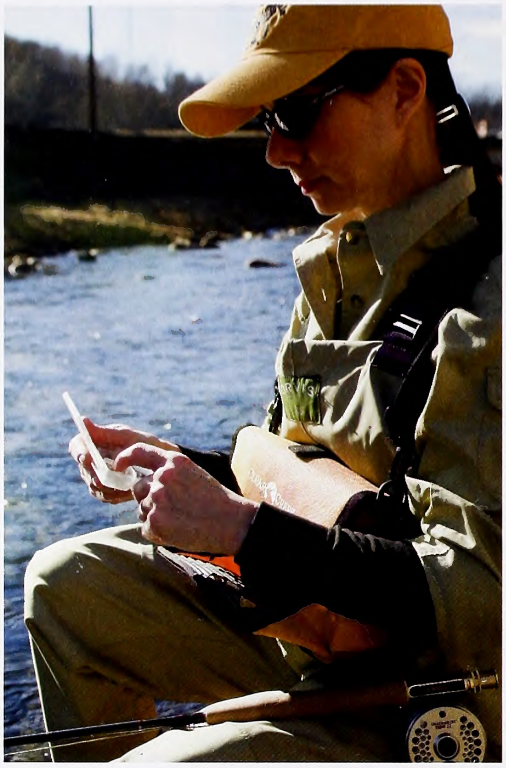
and towns in western North Carolina ıe to realize that anglers bring much- evenue to their economy by purchas- ıg supplies, meals and hotel rooms g excursions. They know that if their e managed to provide quality trout nglers will come.

ıas led many municipalities partner- he N.C. Wildlife Resources Commis- evelop trout fishing opportunities on within their city limits. In addition to g trout management activities, the ion is working with many of these ities to provide additional amenities niversally accessible piers. Some com- also participate in the commission's aekle Loaner Program. This program loaner rods and reels, including fly may be checked out by the public.

ountain Trout Waters

ountain Trout Waters are managed ildlife Commission to provide trout pportunities. These publicly acces- ams and lakes support a variety of ıeries throughout the Mountain North Carolina. Some waters sup- ing for wild trout populations, while quire periodic stockings of hatchery- ut to provide fishing opportunities. ery Supported Trout Waters are by green signs and are open to om 7 a.m. on the first Saturday in il the last day in February. There limit or bait restriction, but anglers only seven fish per day.





The Delayed Harvest program made it possible for anglers to fish year-round for trout and be reasonably assured that fish would be available at any time.

Cities and towns in western North Carolina have come to realize that anglers bring much-needed revenue to their economy by purchasing fishing supplies, meals and hotel rooms for fishing excursions.

Delayed Harvest Trout Waters are marked by black signs and are open from Oct. 1 until 30 minutes after sunset on the Friday before the first Saturday in June. Anglers are restricted to single-hook, artificial lures only and no trout may be harvested or possessed. Delayed Harvest waters change over to Hatchery Supported regulations starting at 6 a.m. on the first Saturday in June to anglers under age 16, and to all anglers at noon.

Wild Trout Waters are marked by yellow and blue signs and are open to fishing year-round. Anglers may harvest only four fish per day with a minimum length of 7 inches. Only artificial lures with a single hook may be used.

There are four additional Trout Waters classifications: Catch and Release—Artificial Flies Only; Catch and Release—Artificial Lures Only; Wild Trout—Natural Bait; and Special Regulation.

Urban trout fishing experiences can be found throughout the mountain region, and commission biologists recommend several of these waters for anglers to explore:

Hatchery Supported: Cub Creek, Wilkesboro; French Broad River, Rosman; Swannanoa River, Black Mountain and Asheville; Valley River, Andrews; Middle Fork New River, Boone and Blowing Rock; Pigeon River, Canton; Scott Creek, Sylva; Buckeye Reservoir, Beech Mountain.

Delayed Harvest: Reddies River, Fort Wilkesboro; Watauga River, Boone.

Wild: Winkler Creek, Boone. Catch and Release—Artificial Flies Only: Elk River, Banner Elk.

Several Hatchery Supported streams receive very little fishing pressure except roadside pullovers and bridges, with angles not realizing that staffers from the commission's hatcheries spread the fish out over the entire stream. Chances are if there is a path down to the bank, fish have been stocked there. Try fishing a little upstream or downstream from where you park.

Many of the Public Mountain Trout Waters flow through private property and Wildlife Commission biologists constantly work with local landowners to allow access for fishing. Many properties have signs stating that access is allowed for fishing only and it is only through the continued support of landowners that these streams remain available to the public for angling. Please respect their property.

tain Heritage Trout Waters Program

lountain Heritage Trout Waters program
of the newer trout fishing programs
. a direct result of partnerships devel-
between communities and the com-
on. Mountain Heritage Trout Waters are
streams that are designated as Public
tain Trout Waters and run through or
ent to cities or towns identified as
tain Heritage Trout Cities. The com-
on manages these streams for trout
ne cities provide public access, and
ne streams noted above, these waters
rovide a wonderful angling experience.
veral western North Carolina towns
rrently participating in this program,
shing regulations depend on the specific
water classification. Cane Creek in
sville, Mill Creek, Old Fort and North
iver in Spruce Pine are classified as
ed Harvest Trout Waters. Jonathan
in Maggie Valley, North Toe River in
nd, Richland Creek in Waynesville,
outh Toe River in Burnsville are des-
d as Hatchery Supported Trout Waters.
of these towns also host Fishing Tackle
r Program sites.

glers, both resident and nonresident,
owed to fish with a three-day, $5 fish-
ense that is good only on sections of
waters that are designated as Moun-
eritage Waters. Anglers who already
a valid North Carolina fishing and
privilege are not required to purchase
ountain Heritage license and may fish
blic Mountain Trout Waters.

g in Cherokee

ualla Boundary, home to the Eastern
of Cherokee Indians, is located in the
vestern mountains of North Carolina. It
ore than 30 miles of trout waters located
y on the Raven Fork, Soco Creek and
luftee River. For at least a couple of
the banks of the Oconaluftee are lined
h sides by motels and various other
sses. Soco Creek runs for several miles
gh numerous campgrounds, behind
and in front of Harrah's Casino.
ese settings are not what most people
of when they envision a trout stream,
waters are stocked with trout and can
e a great day of fishing. Anglers fishing
rs within the Qualla Boundary are not
ed to obtain a Wildlife Commission
fishing license, but will have to obtain a license from the Reservation and abide by tribal regulations. If you tire of urban settings, the adjacent Great Smoky Mountains National Park contains mile after mile of trout streams.

Discovering Gems

Everyone dreams of finding that secluded mountain stream full of trout that nobody knows about. I know people who study their atlases for out-of-the-way blue lines and hike many miles in hopes of finding their own "secret" creeks. Well, those streams could be right under their noses. They might drive right by them on the way to work or the grocery store.

One word of advice: Don't overlook any stream. Sometimes there are healthy trout populations in small streams running right in the heart of a city. You might look at one and think, *There is no way that little stream holds trout.* But many do, and most receive minimal fishing pressure. A little urban exploration (basically, driving around town looking for streams to fish) is all that is required. You never know, one could become your new favorite trout stream.

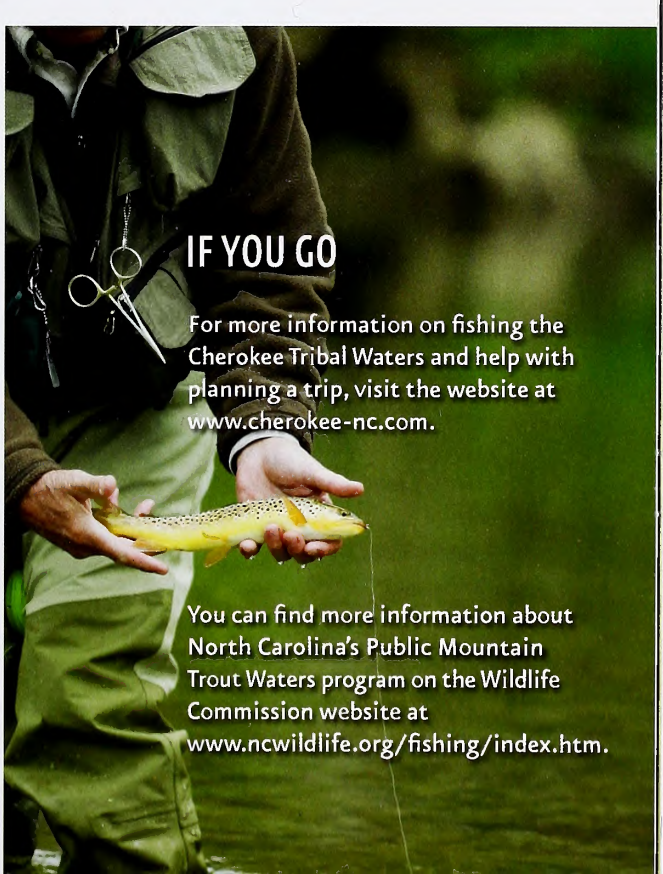
Even though North Carolina boasts more than 2,000 miles of public trout water, there are more than 4,000 miles of water capable of supporting trout. Biologists with the commission actively seek partners interested in creating and increasing public access for trout fishing, but in the meantime, there are lots of other urban trout streams worth exploring. Many of these streams are not Public Mountain Trout Waters and are therefore undesignated, which means that they may be fished year-round without purchasing the trout privilege. However, you are still required to have a fishing license; trout cannot be harvested in March; and Hatchery Supported size, creel limits and bait restrictions apply. Waters are out there for you to explore, but I stress that you must have permission from the landowner before heading out.

There is just something about the mystery that fishing urban waters provide. You never know what to expect or what you might catch. Some larger streams and rivers with marginal trout habitat are home to small populations of brown trout, some of which can be sizable. A number of big brown trout are caught each year in waters that may not be characteristic of a typical trout stream.

So don't give up on a stream of any size if you're catching the occasional sunfish or smallmouth bass, or large numbers of creek chubs. Make sure you give it a fair chance, fishing with large streamers, woolly buggers, rapalas, crankbaits or other minnow- or crayfish-type lures, or in-line spinners such as a Rooster Tail or Panther Martin. Flies and lures like these present a big meal and will move a large trout to attack. It doesn't hurt to fish early and late in the day under low-light conditions or after it rains, when the water is higher and slightly murky. All of these conditions make large fish feel more secure.

Next time you're driving to a secluded trout stream, or on your way to dinner in a mountain town, notice all the streams you're driving by. One of them could be your next favorite place to fish.

Marty Shaffner is a writer and fishing guide living in Elkin. He is a frequent contributor to WINC.



IF YOU GO

For more information on fishing the Cherokee Tribal Waters and help with planning a trip, visit the website at www.cherokee-nc.com.

You can find more information about North Carolina's Public Mountain Trout Waters program on the Wildlife Commission website at www.ncwildlife.org/fishing/index.htm.

Stephen G. Worth

PART ONE OF A THREE-PART SERIES

CHEAPER TO BUY BACON

In attempting to provide food for the people, North Carolina's first fish commission plunged wholeheartedly into artificial propagation, with decidedly mixed results.

WRITTEN BY JIM WILSON ILLUSTRATED BY TIM LEE

"In general, there are no public expenditures that will insure more certain and more immediate returns than those devoted to intelligent and systematic fish-culture."

—Hugh M. Smith,
"The Fishes of North Carolina," 1907

For a fleeting slip of time in the 19th century, two elegant, exotic species of fish glided through mountain rivers of North Carolina, flashing their silver forms in the currents. They were as different from other fish in these waters as reason is from passion. But their time here would be brief, their destiny doomed from the start by biology, geography and the best scientific thinking of the day.

North Carolina would prove no proper home for Chinook salmon, of the northern Pacific Ocean, and Atlantic salmon, native to the northern Atlantic regions, despite their enthusiastic welcome from the state's first fish commission, which released about 800,000 of them into waters public and private. Within several years, the state discontinued stocking these fish, having seen few results but not yet realizing that while cold western rivers might be hospitable for salmon, the long, broad stretches of sluggish, warm waters between mountains and ocean formed a deadly avenue these anadromous species could not negotiate.

Salmon, however, did survive long enough to be caught in North Carolina. Reports exist of 16-inch Chinook being landed "with the fly" in the French Broad River near Asheville, of landlocked Atlantic salmon in the Catawba River and Mill Creek in McDowell County, and landlocked salmon and rainbow trout, another California introduction, taken in fish traps in the Johns River. The salmon left no physical evidence of their presence; they simply ceased to exist, forgotten and unchronicled except in the pages of government reports more than a century old, where their story is a testament to how a 19th-century government agency attempted to remedy a fisheries dilemma by ameliorating the symptoms after realizing it was all but powerless to resolve the causes of the problem.

"At the present time no fewer than 2,000 nets of different kinds are in operation between the mouth of the Neuse River and Goldsboro, N.C.," Yarrow wrote, warning that "if this industry is continued we must expect, in a short time, the same deplorable scarcity of shad here as in the rivers farther south."

North Carolina's early fish commission was short-lived, functioning only eight years, from 1877 to 1885, but some of its work continues to affect the state. Although the bulk of its efforts focused on stocking American shad (*Alosa sapidissima*), a species then economically important to much of the Coastal Plain, the commission's lasting efforts involved the stocking of two exotic species: common carp (*Cyprinus carpio*) and rainbow trout (*Oncorhynchus mykiss*).

The fish commission was born in turbulent times, beginning operations just as Reconstruction ended in the South and occupying Federal troops headed home. Too, the Depression of 1873-1879 had slowed the economy not only of North Carolina, but the nation. The price of cotton, for example, fell about 50 percent between 1872 and '77. This depression was part of the "Long Depression" that affected Europe and the United States for the last quarter of the 19th century.

Although modern Americans tend to think of the 19th century as a period of bountiful natural resources, declines among [illegible] such as white-tailed deer and turkey [illegible] number of fish species already were [illegible] ered acute in some areas. By the lat[illegible] century, American bison already ha[illegible] extirpated in North Carolina, by 18[illegible] Eastern elk was extinct in North A[illegible] and the passenger pigeon and Carol[illegible] akeet would follow early in the 20th [illegible] N.C. State University professor Larry [illegible] has written that given the aggressive[illegible] with which Europeans approached [illegible] America, "local resource depletion a[illegible] ronmental problems" developed rap[illegible] "Pastures were overgrazed, forests w[illegible] harvested, streams were overburden[illegible] wastes, and fisheries were overexplo[illegible]

It was neither mammals nor bird[illegible] moved governments to act in the sec[illegible] of the 19th century; it was fish. As e[illegible] 1864, George Perkins Marsh, conside[illegible] country's first environmentalist, ha[illegible] of the decline of fish in "Man and N[illegible] "[A]lmost all the processes of agric[illegible] and of mechanical and chemical in[illegible] are fatally destructive to aquatic ani[illegible] within reach of their influence," Mars[illegible] "Milldams impede their migrations, [illegible] do not absolutely prevent them, the [illegible] from lumber mills clogs their gills, a[illegible] thousand deleterious mineral subst[illegible] discharged into rivers from metallu[illegible] chemical and manufacturing establis[illegible] poison them by shoals."

The depletion of the inshore com[illegible] fisheries of New England was so di[illegible] Congress in 1871 had created the U.[illegible] mission of Fish and Fisheries, with [illegible] Baird, head of the Smithsonian Inst[illegible] as that agency's director. (In the 20th [illegible] that commission would become the U[illegible] and Wildlife Service.) In 1873 Baird [illegible] Army surgeon H.C. Yarrow to report [illegible] status of American shad in Southern [illegible] "At the present time no fewer than 2,[illegible] of different kinds are in operation be[illegible] the mouth of the Neuse River and Go[illegible] N.C.," Yarrow wrote, warning that "[illegible] industry is continued we must expe[illegible] short time, the same deplorable sca[illegible] shad here as in the rivers farther sou[illegible]

Yarrow found the situation on the [illegible] River also grim. John Embry, "propr[illegible] the Embry House, mayor of the city [illegible] controller of all the fisheries on thi[illegible] of the Roanoke River," was so efficie[illegible] catching shad with a fish slide — a c[illegible]

ıcted of lumber and wooden screens
›art of the river—that Yarrow predicted
less this method of fishing changed,
vill have disappeared almost entirely
ıese waters in a few years hence."
y also joked to Yarrow that should the
h Commission desire to begin prop-
striped bass, he could provide a train
of eggs in a matter of two weeks.)
as this diminution of food fish pop-
s that prompted the formation of
Carolina's first fish commission, as it
25 other states over the 13 years since
ampshire had formed the nation's
nmission. Thus, the General Assembly
the state department of agriculture in
ith prominent agrarian leader, politi-
d journalist Leonidas Lafayette Polk
irector. The legislation also charged
culture department "with the super-
f all measures for the protection, prop-
and culture of fish in the rivers and
nland waters of this state, and to this
y shall at once provide for stocking
lable waters of the state with the most
ed breeds of fishes."
an agricultural agency should over-
state's initial forays into fish culture
s incongruous as it might seem.
gh the majority of today's fishermen
eational anglers, until the 20th cen-
hing was pursued primarily for sus-
or income. In carrying out its charge
e general assembly, North Carolina's
heries agency would take the prag-
pproach that fish are a crop to be
ed. That remains the function of
commercial aquaculture: the
tion of food fish for market
ıe case of some species,
king in private ponds.
idea of animals as a
o would become
tenet of the sci-
wildlife manage-
eceiving 20th-
validation in
opold's 1933
Management"
ıe conservation
ote: "Game man-
t is the art of mak-
l produce sustained
crops of wild game for
onal use. ... Its nature is
derstood by comparing it
other land-cropping arts."

Polk and Stephen G. Worth, superintendent of the North Carolina commission, believed there were two major problems to overcome in North Carolina: the many dams on our streams and the multitude of nets in the water, particularly in the Coastal Plain. The dams prevented anadromous fish species from ascending into the interior of the state, thus depriving those citizens of food fish. The nets effectively did the same thing: The catch in the east prevented fish from reaching the interior.

"Shad and sturgeon formerly ascended the Catawba and Yadkin to their head waters," Worth wrote. "By man's agency they have been cut off, and the result is sadly felt." He decried the "alarmingly apparent" decline as being "an outgrowth of our civilization and results first from cutting them off from their favorite spawning grounds with dams, and second by increased fishing to supply the wants of a growing population. ... A general law requiring all owners of dams to build a sluice-way over each, after a pattern prescribed by your board is our only hope. ... The dams stand as barriers and destroyers and if the remedy is not applied our annual supply will necessarily be on the diminishing scale."

Worth ostensibly had the backing of the general assembly in his pleas for a solution to the problems brought by dams. In the department of agriculture's establishment bill, the general assembly had instructed the department to "report upon the practicability of constructing fish-ways over dams and other obstructions ... and secure, as far as practicable, the co-operation of mill owners."

Polk, however, realized that a solution to the problem of the dams, "erected from bank to bank by private parties," would be a thorny matter. "While it is repugnant to the spirit of our people, as well as to our organic law, to invade the rights of the citizen, yet it is equally repugnant to grant a citizen exclusive privileges and emoluments," Polk wrote. The question he posed was this: "Has a citizen, living, for example on the Roanoke, the Cape Fear, or Pee Dee River, the right to erect dams or other obstructions in that stream, that he may appropriate the products and profits of such stream to his own use, thereby excluding the thousands of citizens further in the interior and contiguous to such stream from its benefits?"

The answer for Polk was clear. "We must have a free passage for the fish of our streams, and especially in our rivers," he wrote. "Were this effected by the enactment and enforcement of proper laws, we might hope at no very distant day to see our streams, by natural reproduction, restored to their original productiveness. I would therefore, earnestly suggest that the attention of the General Assembly be directed to the importance of enacting an efficient general law, to apply to all our principal waters, for securing the free passage of fish."

A man ahead of his time, Polk also called upon the general assembly to address the "wanton and reckless destruction of birds and other game in the State." Having had "extensive correspondence with intelligent citizens in different portions of the State," Polk was convinced that North Carolinians would support a "law to prevent the indiscriminate slaughter which so seriously threatens extermination to many of our most valuable species of game.

"Vast numbers of even insectiverous and other harmless birds (and which are good friends of the farmer) are annually destroyed. The partridge, turkey and deer especially are eagerly destroyed without regard to value or season, for mere sport, and I earnestly recommend that your Board ask for the enactment of better laws to protect our game."

Chinook Salmon

However, Polk would not long remain as head of the agriculture department, an agency he helped create with Gov. Zebulon Vance. After a new governing board was put in place for the department following the election of Vance to the U.S. Senate, Polk resigned his post in 1880. He went on to found *Progressive Farmer* magazine, helped establish N.C. State University, Meredith College and the N.C. Museum of Natural Sciences and became a national figure in the populist movement. He likely would have received the People's Party nomination for president in 1892, but died shortly before the convention.

It became apparent to Worth by 1881 that "practicable" solutions the legislature spoke of would not be found quickly, if at all. "With the destructive agencies removed they [fish] would soon be plentiful, but agencies are being multiplied," he wrote of the dams. He also realized that stopping overfishing was going to be impossible. "To arrest the fishing for a term of years would add greatly to the increase which would take place naturally, but this would throw into disuse thousands of dollars worth of nets and boats and would be as absurd as it is impossible," he wrote.

Although the legislature did pass numerous statutes providing for fish passage and restricting harvest, enforcement was minimal at best, a situation that extended well into the 20th century for both fish and wildlife laws. Consider the plight of Frank Coxe, owner of a plantation in Polk and Rutherford counties between the Green and Broad rivers. In seeking "a million or two" American shad from the federal fish commission in 1884, Coxe tells of how finally the shad were returning far upstream after the Cherokee Dam some miles down river had finally washed out after 40 years of existence. One concern remained, Coxe wrote: "The only problem this season in protecting the fish has been with the dynamite cartridge. We have a ganger here for a small distillery a few miles below, who has been throwing these cartridges in the river, which destroyed every fish, large and small, in 50 feet around; and when he was told he would be indicted, said he would like to see the State officer that could arrest him, and the trouble is that three-fourths of the people believe what he says."

North Carolina had a general law in place by 1879 making it a misdemeanor to take fish with dynamite cartridges, punishable by a fine of not less than $5 nor more than $25 upon conviction. Fishing with dynamite continued to be a problem in some areas of the state for many decades.

As for dams and other artificial obstructions, as far back as 1787 the state had mandated that any owner of an obstruction on a river, such as a dam, must provide passage for fish or pay a penalty of 5 pounds per 24 hours that the river was blocked. The legislature continued passing other such laws, specific to individual waterways, throughout the next century, but accomplished little. It would be 1927—50 years after Polk's plea for protection of wildlife—before North Carolina passed a comprehensive state law establishing game and fish seasons, along with bag and creel limits.

The question remained as to how North Carolina could bring food fish to residents of the interior of the state, where, as Worth wrote: "The migratory fishes no longer appear. ... Citizens of these counties now depend upon the purchase of fish brought by rail, or else follow the more usual rule and go without. ... We desire to make fish cheaper for the people—cheap, as a food supply. It is only in favored localities in the more eastern belt of our State that the poorer classes of our citizens can afford to buy fish. Outside this territory, the price is such that it is cheaper to buy bacon."

"As for dams and other artificial obstructions, as far back as 1787 the state had mandated that any owner of an obstruction on a river, such as a dam, must provide passage for fish or pay a penalty of 5 pounds per 24 hours that the river was blocked."

What was left for the state was the relatively new and popular science of the artificial propagation of fish. "Propagation by the artificial method is an outgrowth of necessity," Worth wrote. Stocking fish would be the solution for everything—the dams, the overfishing, the pollution and the lack of enforceable laws. Not only would citizens of the state have plenty of fish to eat, but also there would be an abundance of fish to take to market.

North Carolina's policy would mimic that of the federal fish commission, which was expressed best in 1884 by George Brown Goode, who briefly held the job as c[om]missioner of the agency after Baird's de[ath]. "[I]t is better to expend a small amo[unt] public money in making fish so abu[ndant] that they can be caught without rest[riction] and serve as cheap food for the pe[ople] large, rather than to expend a much [larger] amount in preventing the people fro[m] ing the few that still remain after ge[ne]tions of improvidence."

The possibilities, in terms of foo[d] commerce, seemed limitless. In app[ealing] the legislators of the actions of the fi[sh] mission, Worth stressed that the sta[te] earn sizable sums of money at little e[xpense]. "Few realize the value of fish," he wr[ote]; a moment of reflection will show th[at] cost us nothing, and that by replacin[g] in the waters by aiding their imperfec[t] we restore to our land at a nominal c[ost] millions of wealth that our streams a[re] bear away to the ocean. Who know[s] value of the constituents of our glid[ing] rivers, and by what means can we re[gain] it? By the judicious expenditure of [a] thousand dollars an[nually] we can attain it."

Noting that our st[ate] has the "finest shad f[ish]grounds in the world," [he] wrote that by stockin[g] sounds ands rivers t[o] times their present c[atch] we can supply every demand at hom[e] bring into our State thousands of d[ollars] from abroad. As the truck-farms of th[e] are annually reducing the value of lil[y] ducts on those further north, in sup[ply] the ready demand for early vegetabl[es] fruits, so will the fisheries of the Alb[e]Sound and other waters, in like man[ner] large cash sums of money from nor[th]markets if the millions of eggs now a[re] wasted on the seine beaches, are only [hat]and cared for."

Worth noted, too, that artificial p[ro]tion was much more efficient than n[at]"On examination of the nests of the [Cali]fornia Salmon it is found that only ei[ght]cent of the eggs are impregnated," he [wrote] in 1880. "By the artificial method of in[cu]tion we secure *ninety* to *ninety-five* p[er]

Americans' interest in stocking f[ish] was nothing new, and dates back to T[hom]Jefferson and Benjamin Franklin. Ho[wever] it was not until 1853 when plastic su[rgeon] Dr. Theodatus Garlick first success[fully]

propagated fish in this country by growing brook trout on a farm near Cleveland. Artificial propagation had been practiced in Europe since 1843, but in the United States, it was still the latest thing. The novelty of fish culture was so compelling that in some northern states, people were hatching out brook trout in their living rooms as hobbies.

Even the authors of a book that extolled the pleasures of fishing the North Carolina mountains for brook trout could not help but espouse the possibilities of fish culture. In "Heart of the Alleghanies [sic] or Western North Carolina," published in 1883, Warren G. Zeigler and Ben S. Grosscup comment: "A fortune could be made in fish culture in the Carolina mountains. The valley of Jamestown, six miles east of Cashier's valley, is admirably suited for an enterprise of this kind. A lake of six square miles could be formed here by damming, at a narrow gorge, a fork of Toxaway [River]."

Although the idea of artificially propagating fish was captivating, the reality in North Carolina was daunting for one critical reason: Not a man in the state knew anything about fish culture. That proved no impediment

For the one-year period ending April 1, 1879, Worth reported that the fish commission had released "over three and one-half millions of young shad, three hundred thousand California Salmon, fifteen thousand and five hundred Landlocked Salmon from Maine, and fifty thousand Mountain or Brook Trout."

to immediate action. The state's firs[illegible] at collecting shad eggs in April 187[illegible] days after the agency was formed, [illegible] but minimally successful, despite th[illegible] ence of experienced fish culturist [illegible] Clark of Michigan, sent by the U.S. fi[illegible] mission to assist. Polk explained the [illegible] success simply: "Prevailing freshet[illegible] diminutive run of shad interfered w[illegible] success of the work."

Within a scant two years, howev[illegible] state's fish culture work, led by Wor[illegible] of the workers in the state's first att[illegible] collecting shad eggs, had stocked m[illegible] of fish. Polk, writing in 1879, noted [illegible] results belied the state's lack of prep[illegible] to begin culturing fish. "Commenci[illegible] two years ago without a shad box, [illegible] uting can, or the least preparation [illegible] necessary apparatus used in fish c[illegible] or without a man in the State who [illegible] the principles of the work, the peop[illegible] State may congratulate themselves [illegible] has been attained."

For the one-year period ending [illegible] 1879, Worth reported that the fish c[illegible] sion had released "over three and o[illegible]

ns of young shad, three hundred
nd California Salmon, fifteen thou-
nd five hundred Land-locked Salmon
Maine, and fifty thousand Mountain
ok Trout."

his art is so new that very few among
e had an opportunity of looking into
ciently to know its requirements or to
dgment on past operations," Worth
further stating that all of the stocking
en accomplished for under $3,000,
ing "a sum not less than five hundred
in permanent structure and hatch-
l distributing apparatus, tools, etc.,
n hand, including all salaries. This
hen compared with results will bear
le comparison with similar work done
here on the globe."

he beginning, Worth predicted those
rnia Salmon" could be the backbone
state's stocking operation. The state
d eggs from the federal commission
tched them out at facilities in Swan-
and Morganton, eventually planting
0 Chinook. "To convey an idea of the
se returns in fish culture, I will make
nent which may surprise you," Worth
"California Salmon attain an average
of 20 pounds, and will sell readily at
five cents a pound. If we suppose that
nine per cent of the three hundred
nd hatched this season are never
rom again and that the one percent
do return attain the average weight
r waters and bring a price of five cents
d, the salmon of the past season
vill more than pay the expenses
whole season, including the Shad,
ocked Salmon and Trout. ... Why
not live here I cannot see."

se dreams of piscine plenty
o naught. Writing in his
The Fishes of North
na," ichthyologist
mith concluded that
gh the planting of
ok salmon (*Oncor-
tshawytscha*) and
c salmon (*Salmo*
ight have been justi-
in view of the lack of
dge of the requirements
e fishes ... they are now
to have been entirely useless
itures of time and money."
ct, the Chinook were a failure
here they were introduced. Anders Halverson relates in "An Entirely Synthetic Fish" that despite 45 million Chinook eggs having been shipped across the country, primarily to Eastern and Southern states by 1879, "Not a single new run of these fish had been established."

The eggs were captured and fertilized at the McCloud River hatchery in California and transported to 29 states. More than a decade after the federal commission ended its attempts to stock Chinook east of the Mississippi River, Livingston Stone, who had built the hatchery and directed its operations, spoke of the failure as a "stupendous surprise and disappointment." "The eggs hatched out beautifully," Stone said. "The young fry, when deposited in the fresh-water streams seemed to thrive equally well. They grew rapidly and when the proper time came were observed to go down in vast numbers to the sea. What afterwards became of them will probably remain forever an unfathomable mystery."

The state stocked many fewer Atlantic salmon than Chinook, only about 15,000. According to Smith, the stocking of Atlantic salmon was particularly impractical. "As the natural habitat of this salmon includes no streams south of New York, the waters of North Carolina were manifestly unsuited for the species and the attempt was almost necessarily a failure."

However, Smith, who would later lead the federal fish commission, believed the landlocked Atlantic salmon, which trout biologist Robert Behnke describes as an environmental rather than genetic subspecies of Atlantic salmon, could have survived in North Carolina. He suggested that the waters where those fish were stocked in 1878 and 1881—the Dan, Linville, Mayo and Johns rivers and creeks in McDowell and Burke counties—were not the most suitable.

"No results from these plants were ever noted," wrote Smith, who thought Lake Toxaway in Transylvania County would have proven a better location. At the time of Smith's writing, the U.S. Bureau of Fisheries had sent about 30,000 landlocked salmon eggs for hatching to Toxaway, but the original lake, built in 1902, vanished in 1916 when its earthen dam broke. The lake was rebuilt in the 1960s, minus the salmon.

Of the six species stocked by the state fish commission during its history, only two, American shad and brook trout (*Salvelinus fontinalis*), were native to North Carolina, and the agency stocked brook trout but once, in 1879 when 36,000 were planted. (Some fish in this stocking were an attempt to restore brook trout populations to streams that no longer held them, such as those near Glen Alpine Springs in Burke County.)

The agency attempted to propagate striped bass, but with little success. Worth, at the behest of the federal commission, did, however, establish in 1884 a hatchery at Weldon on the Roanoke River, a site that would be used by the federal commission and later the N.C. Wildlife Resources Commission to grow and release millions of striped bass. In addition to Chinook and landlocked salmon, the other exotic species planted by the agency were common carp and rainbow trout, each of which would have a lasting impact on the state, but by very dissimilar means. ◆

Common Carp

Jim Wilson is the associate editor of Wildlife in North Carolina. *He can be reached at jim.wilson@ncwildlife.org.*

Part Two: May 2011
Common carp and rainbow trout find permanent homes in North Carolina

Part Three: June 2011
The rise of modern, consistent hatchery operations throughout the state

Butterflies in the swallowtail family have an interesting array of affiliations and behaviors, often unique to a species.

SPICEBUSH SWALLOWTAIL (WING DETAIL)
TODD PUSSER

Swallowtails,

SNAKEROOTS AND SLIMY HORNS

Written by
Doug Elliott

large, velvety black butterfly flashing metallic blue hind wings fluttered past my feet. I was exploring an Piedmont forest of oak, hickory and ood near the Broad River in Cleveland y on a sunny April afternoon. This ly was flitting along near the ground. were no flowers blooming in the area, s butterfly was flying up to every young shoot — honeysuckle, asters, grasses, edlings, etc. It wasn't landing on these Rather, it flew from one plant to r, spending a second or two at each as if checking it out. The butterfly ight by taller plants and bushes, pausy at delicate shoots 2 to 4 inches high. nunting a rare herb.

butterfly was a gravid female pipevine wtail, ready to lay her eggs. She was ing for the one species of pipevine n this area: *Aristolochia serpentaria,* newhat rare medicinal herb known inia snakeroot. As an adult butterfly uld sip the nectar of many different , but her young could feed only on rs of the pipevine family. Here in the ont of North Carolina, Virginia snakeis the only choice.

tched her start hovering excitedly one particular delicate sprout with ght green, unfurling leaves. No doubt s receiving chemical/olfactory conon. "Yes!" her rapidly fluttering wings to say. "Finally, I've found it!" While gs kept her airborne, her legs reached l grasped the plant. The tip of her en briefly touched the stem, and e placed a glistening golden egg that dly bigger than a poppy seed.

PIPEVINE BUTTERFLY

Within a few seconds she was on her way again, continuing her plant-by-plant search for the next snakeroot. I followed her at a respectful distance for the next half hour or so as she continued her thorough survey of the forest floor. We may have covered as much as 100 yards, and she inspected several hundred plants as she zigzagged back and forth along the ground. In the entire time I spent observing her, she found only that one Virginia snakeroot shoot, and she deposited only that one egg. She eventually flew up into the canopy, and I lost sight of her.

Virginia snakeroot is an understated, diminutive herb. Any specimen over a foot tall and having more than 10 leaves is considered large. Even in areas of ideal habitat where the plant is relatively common, I never see it growing thickly in beds or patches — just an occasional plant here and there. The butterfly I was following, which had dozens of eggs to deposit, seemed instinctively to understand the plant's limited growth habit. She placed only one egg on the plant she found because the plant could support only one caterpillar. Up in the higher mountains on the 8-inch leaves of the huge Dutchman's pipevine (*Aristolochia macrophylla),* I have seen more than a dozen eggs deposited on a single leaf.

Swallowtails are our largest butterflies and are named for the graceful "tails" on their hind wings. There are seven species that live in North Carolina. Along with the pipevine swallowtail, which is found most commonly in the Mountains and Piedmont, we have the tiger, spicebush, black and zebra swallowtails, which are common statewide. On the Coastal Plain the palamedes and the giant swallowtail are occasionally seen.

The yellow-and-black tiger swallowtail is usually the first to appear in spring and is probably the most familiar of the swallowtails. It is found throughout most of eastern North America from Canada to Florida. I first became aware of these marvelous critters when I was hardly more than a toddler. We had a patch of daylilies in our yard, and one of my favorite activities was to wait for hungry swallowtails to come visiting.

When a tiger swallowtail visits a daylily bloom, it works its way down the cone-shaped throat of the flower to get the nectar, and in the process its wings fold tightly and it is unable to see its surroundings. All I had to do was reach in and gently hold the wings together, and I would be holding a struggling miracle of nature in my hand. I would marvel at its flailing legs, bulging compound eyes, delicate antennae and tightly rolled proboscis. I would chuckle with delight as I loosened my hold and watched it fly madly away.

WILL COOK

JUSTIN VALLEAU

WILL COOK

WILL COOK

DOUG ELLIOTT

WILL COOK

Top left above photos (butterfly above its caterpillar): two pipevine swallowtails and the pipevine caterpillar. Above middle pair: giant swallowtail. Above right pair: spicebush swallowtail. Trio below, left to right: tiger swallowtail, tiger swallowtail caterpillar and female dark-phase tiger swallowtail. Females can be dark or yellow, but males are always yellow.

CLYDE SORENSON

TODD ELLIOTT

WILL COOK

I recently found out that this bright-colored butterfly has a dark side. A certain percentage of the females have dark wings with little yellow on them. This dark phase is believed to have a selective survival advantage in areas where the pipevine swallowtail occurs. As mentioned above, the pipevine swallowtail larvae and caterpillars feed exclusively on members of the pipevine family. These plants contain distasteful, carcinogenic and somewhat toxic, aristolochic acids. These chemicals, which are stored in the bodies of both the larvae and the adult butterflies, make the insects unappetizing to birds and other predators, which soon learn to avoid them. Any butterfly that resembles the dark pipevine swallowtail benefits from this resemblance.

The spicebush swallowtail is another of the mimics. With its dark forewings, blue green dusting on the hind wings and orange spots on the underside of the hind wings, it is easily confused with the pipevine swallowtail—whether you are a hungry bird or an avid entomologist. The butterfly is named for the spicebush shrub *(Lindera benzoin)*, which is its larva's favorite food (although it sometimes is found on sassafras as well). The caterpillar feeds at night and uses its silk to fold over a leaf to conceal itself during the day. You can often get a glimpse of these amazing creatures by closely examining a spicebush that has nibbled leaves and then carefully opening any nearby folded leaves.

Most caterpillars shed their skins several times as they grow. In its younger stages, the spicebush swallowtail caterpillar is b and shiny with smeary white markings body, resembling fresh bird poop. As larger and the ruse would be less conv the caterpillar develops large, realistic- fake eyes and looks like a snake's hea

When a swallowtail caterpillar is r pupate, it spins a small pad of silk to its hind feet and a silken sling aroun middle of its body. Within a few hou sheds its last larval skin and becom angular, hard chrysalis (often hangin a branch like a fossilized telephone lin A swallowtail spends the winter in th salis stage, and in springtime the ch splits open and the new butterfly em However, in much of the South, swall have two or three broods a year.

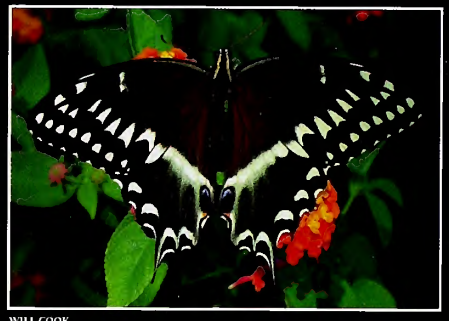
)ther dark swallowtail is the black
wtail, whose favorite larval foods are
, dill, fennel, Queen Anne's lace and
nembers of the carrot family. When
u found one of these "slow moving
" with the "spotted black and yellow
he compared it to an ornately deco-
ast Indian elephant. "What if these
s large as elephants?" he wondered.
zebra swallowtail is probably the
legant of our swallowtails, with its
nd-white-striped wings with a flash
it the base of the long, graceful tails.
vae always feed on pawpaw leaves.
first time I laid eyes on a large pipe-
vallowtail caterpillar, I didn't know
was seeing. It was like a weird, pur-
rown sea slug with rubbery tentacles
g out on all sides and two rows of
orange spots running down its back.
calmly munching its way down the
our prized Virginia snakeroot plant,
grew wild at the edge of our orchard.
va had already eaten all the terminal
nd was in the process of finishing off
of the lower leaves.
at was I to do? I had been able to find
w of these special plants in our area.
re this prize specimen (the only one
nd near the house) was being com-
devoured by the larva of a magnifi-
beautiful and special butterfly. Should
ler the caterpillar a pest and simply
it like a bean beetle or a cabbage worm
arden?
lering this, I gave the critter a tenta-
)d, and the caterpillar responded
tately with a pair of what looked like
ellow horns that seemed to ooze out
hind its head. Suddenly the air was
ith a strange bitter odor. In a few
s the horns were pulled back into the
nd the odor dissipated. What an awe-
isplay! These hornlike appendages
ally a gland called the osmeterium,
odor serves as a repellant to para-
sps and other predators.
lenly, a few feet away, something
ny eye. It was another caterpillar just
s one, munching away on another
snakeroot! And then I saw another,
)ther and another. Each caterpillar was on a separate plant. With the help of these eye-catching caterpillars I ended up finding eight more snakeroot plants in the orchard—plants that I might never have seen and probably would have mowed over if the caterpillars hadn't called my attention to them.

I left those caterpillars alone and over the next few days watched as they ate my plants right to the ground. Then they crawled away to pupate. With the caterpillars out of the picture, the snakeroots soon sent up new shoots with new leaves, and these lasted the rest of the summer. Now each of those snakeroots is protected by a circle of stones. I spend a fair amount of time with the plants, and I keep them weeded as well as I can. Some years the butterflies appear, and we can witness their entire cycle. We have even watched a swallowtail emerge from its chrysalis before our eyes and fly away.

The swallowtails in their various life forms have taught me a great deal, not only about the ecology of Virginia snakeroot and other plants, but also about the miraculous interconnectedness of life on Earth. ⬘

Doug Elliott is a nationally known naturalist, storyteller and performer who has produced a number of award-winning recordings and books. More info and a schedule of his work can be found at www.dougelliott.com.

CLYDE SORENSON



WILL COOK

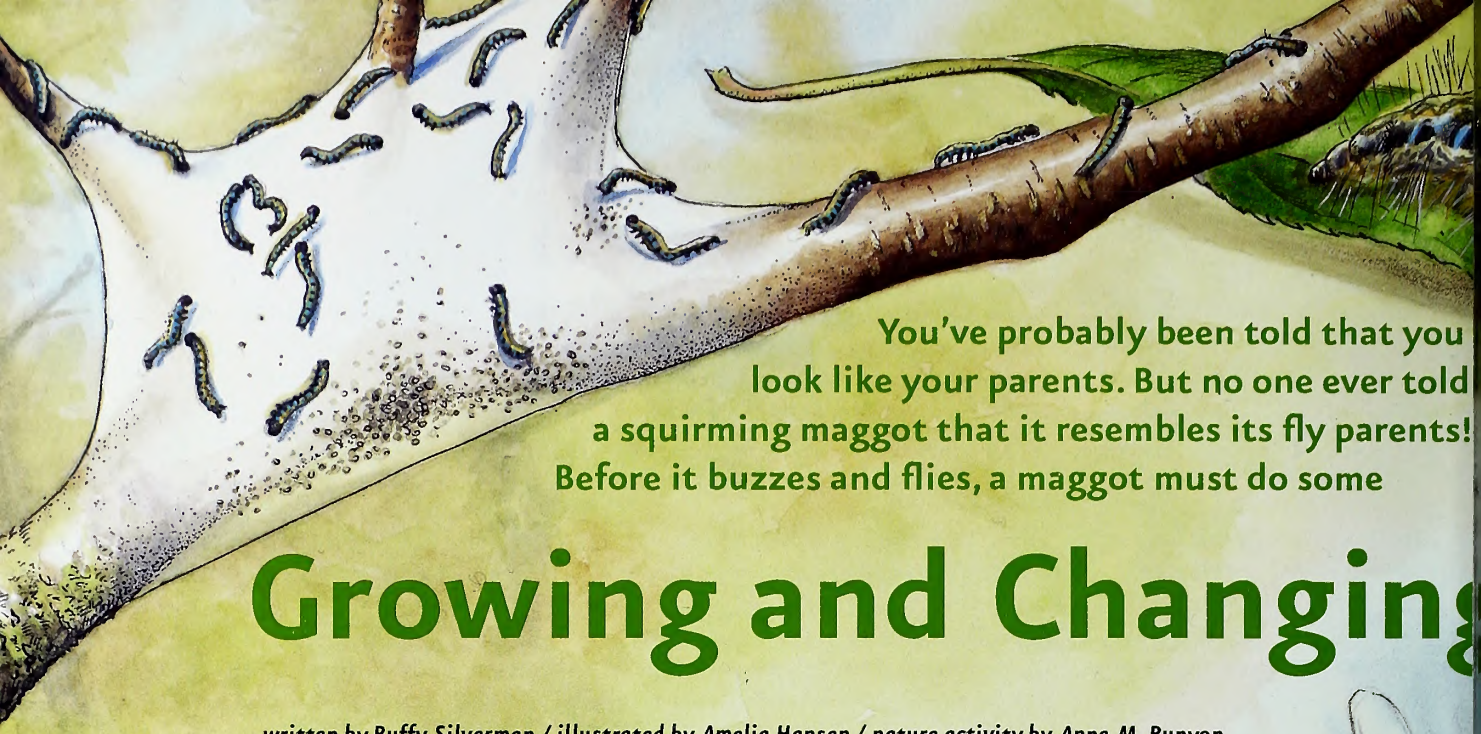
TODD ELLIOTT

WILL COOK

CLYDE SORENSON

WILL COOK

Clockwise from top left: zebra swallowtail, palamedes swallowtail, black swallowtail male, black swallowtail female, black swallowtail caterpillar, zebra swallowtail caterpillar.

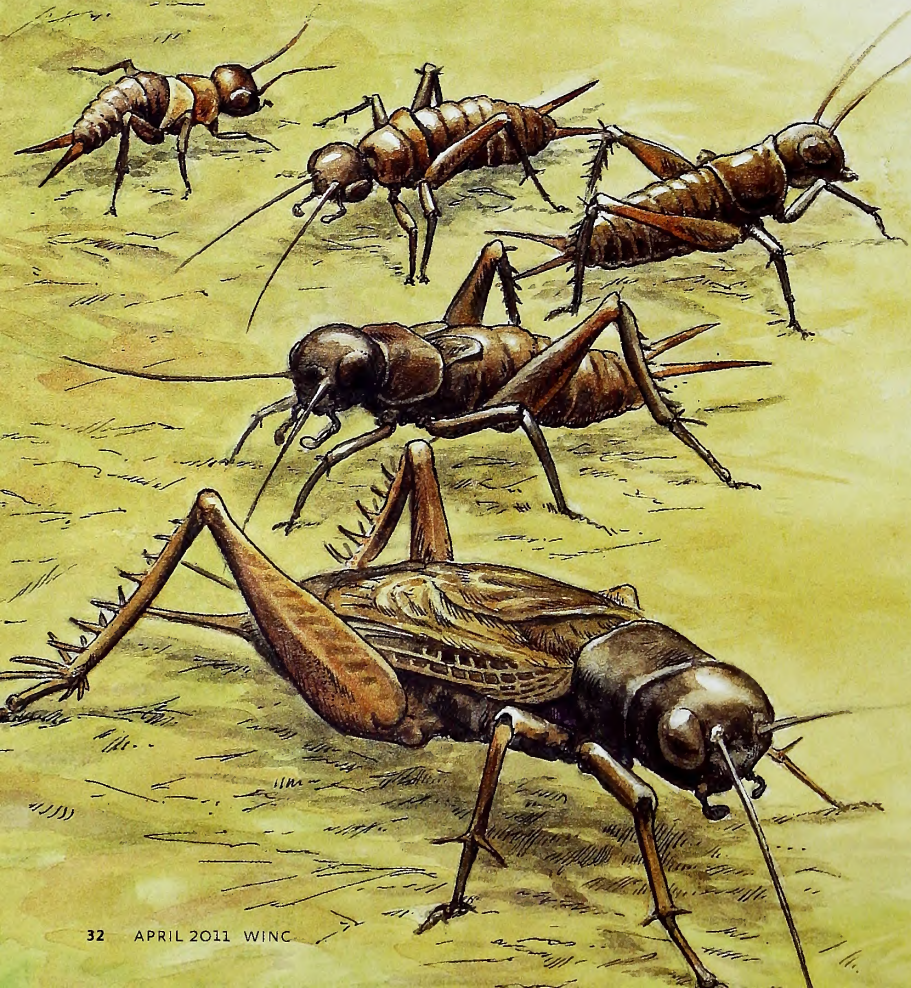


You've probably been told that you look like your parents. But no one ever told a squirming maggot that it resembles its fly parents! Before it buzzes and flies, a maggot must do some

Growing and Changing

written by Buffy Silverman / illustrated by Amelia Hansen / nature activity by Anne M. Runyon

Metamorphosis means changing form. Animals that go through metamorphosis change what they eat, where they live, how they move and the way their bodies appear. Crawling caterpillars crunch on leaves before changing into soaring butterflies that sip nectar. Tadpoles lunch on tiny pond plants; they grow and change into hopping toads that snag spiders and flies. Starfish larvae are too small to see as they float and drift in the ocean. They look nothing like adult starfish that cling to rocks and pull open clams. By changing what they eat and where they live through metamorphosis, animals avoid competing for food and space with their young.



CHANGING GRADUALLY

Certain insects change shape gradually. Cric dragonflies and leafhoppers undergo grad metamorphosis. When these insects hatch f eggs, they are called nymphs. Although a ny cannot fly, it has six legs like an adult insect. grows, it becomes too large for its hard outer and sheds it. Each time it sheds its skin it lo more and more like the adult. When it is f grown it sheds its skin for a final time. Now i wings to fly and it can reproduce.

On a spring day you find frothy spittles on stems and pine trees. Inside are tiny nymphs o spittlebugs. Facing head down, nymphs push beaks into stems and suck plant sap. Extra pumps out their rears, creating spittles that over their bodies. Spittles protect growing ny by keeping them moist. When nymphs are f grown they shed their skin for a final time changing into adults that can hop and fly aw from danger.

ANGING COMPLETELY

er insects change shape in stages that look differ-
from one another. Ants, bees, beetles, flies and
hs undergo complete metamorphosis. When they
h they look like tiny worms, called larvae. Grubs,
maggots and caterpillars are other names for
larvae. A larva eats and grows, shedding its
skin several times. Then its skin hardens into
a tough pupal case. Inside a pupa its body
changes form, growing all the structures needed
as an adult. It emerges with new legs, wings and
nouthparts, and is ready to reproduce.

On the first warm day in spring, tent caterpillars
rge from eggs laid on cherry or apple trees. The
rpillars build a group nest in a tree fork. Three
s a day they leave their nest to munch leaves, leav-
ilk trails. Caterpillars follow well-traveled trails to
good feeding spots. Inside the nest, caterpillars
their skins. After the fifth shedding, they leave
ree and crawl under a log or other protected
e. There they weave cocoons and pupate. Adult
ns emerge from the cocoons, ready to find mates
lay eggs.

WET BEGINNINGS

Salamanders, frogs, toads and other amphibians have two different stages of life. Most amphibians lay jelly-covered eggs in ponds or streams. When larvae hatch, they usually live in water and breathe with gills. As adults they have lungs for breathing air and legs for traveling on land. Some amphibians change from plant-eating larvae to insect-eating adults. Their digestive tracts change, too.

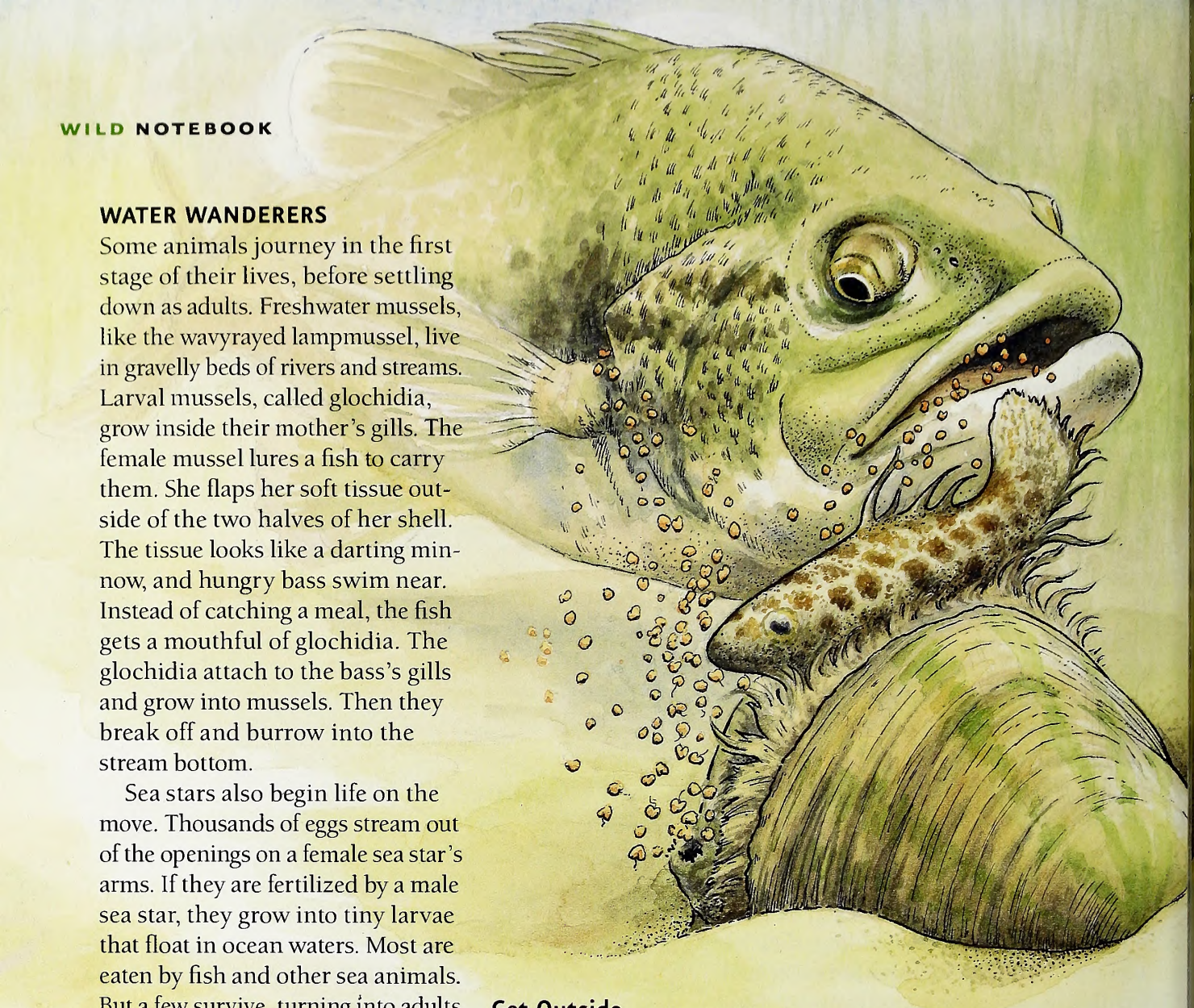
On warm, rainy nights in winter and early spring, male spring peepers puff their throats like balloons. Females hear their high-pitched peeps, and hop to ponds and marshes to find mates. There they attach hundreds of eggs on underwater plants. Tadpoles hatch and hide in the leaf litter at the bottom of the pond. They graze on algae and other pond plants. In a couple of months they change into tiny frogs and leave the water. They climb into bushes and hunt spiders and insects.

Black-bellied salamanders live in cool, mountain streams. Females lay eggs beneath rocks and guard them. When the larvae hatch, they breathe with feathery gills. For three years they swim, hunt and grow in the center of streams. Then they change into adults that breathe through moist skin. Now they swim along stream edges and crawl into burrows along the bank.

WATER WANDERERS

Some animals journey in the first stage of their lives, before settling down as adults. Freshwater mussels, like the wavyrayed lampmussel, live in gravelly beds of rivers and streams. Larval mussels, called glochidia, grow inside their mother's gills. The female mussel lures a fish to carry them. She flaps her soft tissue outside of the two halves of her shell. The tissue looks like a darting minnow, and hungry bass swim near. Instead of catching a meal, the fish gets a mouthful of glochidia. The glochidia attach to the bass's gills and grow into mussels. Then they break off and burrow into the stream bottom.

Sea stars also begin life on the move. Thousands of eggs stream out of the openings on a female sea star's arms. If they are fertilized by a male sea star, they grow into tiny larvae that float in ocean waters. Most are eaten by fish and other sea animals. But a few survive, turning into adults that crawl along the rocky bottom near the shore.



Get Outside

When you hear peeps and croaks, you know frogs and toads will soon mate and lay g
Watch for them and their eggs near the edge of a pond. Toads lay two long strings o
coated eggs, often wrapped around plants. Frogs lay clumps of eggs that float on wa
are attached to plants. Return in a week or two to search for wriggling tadpoles.

Read and Find Out

- "From Caterpillar to Butterfly" by Deborah Heligman, HarperCollins, 1996.
- "From Tadpole to Frog" by Wendy Pfeffer, HarperCollins, 1994
- "Guide to Amphibians and Reptiles" by Thomas F. Tyning, Litt Brown and Company, 1990.
- "Life Cycles" by Michael Elsohn Ross, Millbrook, 2003.
- "Metamorphosis: Changing Bodies" by Bobbie Kalman, Crabtree Publishing, 2008.
- "The Frog Scientist" by Pamela S. Turner, Houghton Mifflin, 20

In *Wildlife in North Carolina:*

- "Could a Caterpillar Be Beautiful?" by Kerry Givens, September

Find out more about Project WILD Workshops and literature at t
Wildlife Commission's website at www.ncwildlife.org.

Tadpole to Toad Paper Sculpture

Based on the metamorphosis of an Eastern narrow-mouthed toad

old in half at noses.

Unfold, and fold in half along backs.

ut out toad and tadpole along thick lack line. Start at tadpole end ⓐ nd cut along line to end at toad ⓑ. ut out part ⓒ last. Unfold.

old up each side of tadpole tail, and nfold. *This will allow tail to tuck nside when becomes a toad.*

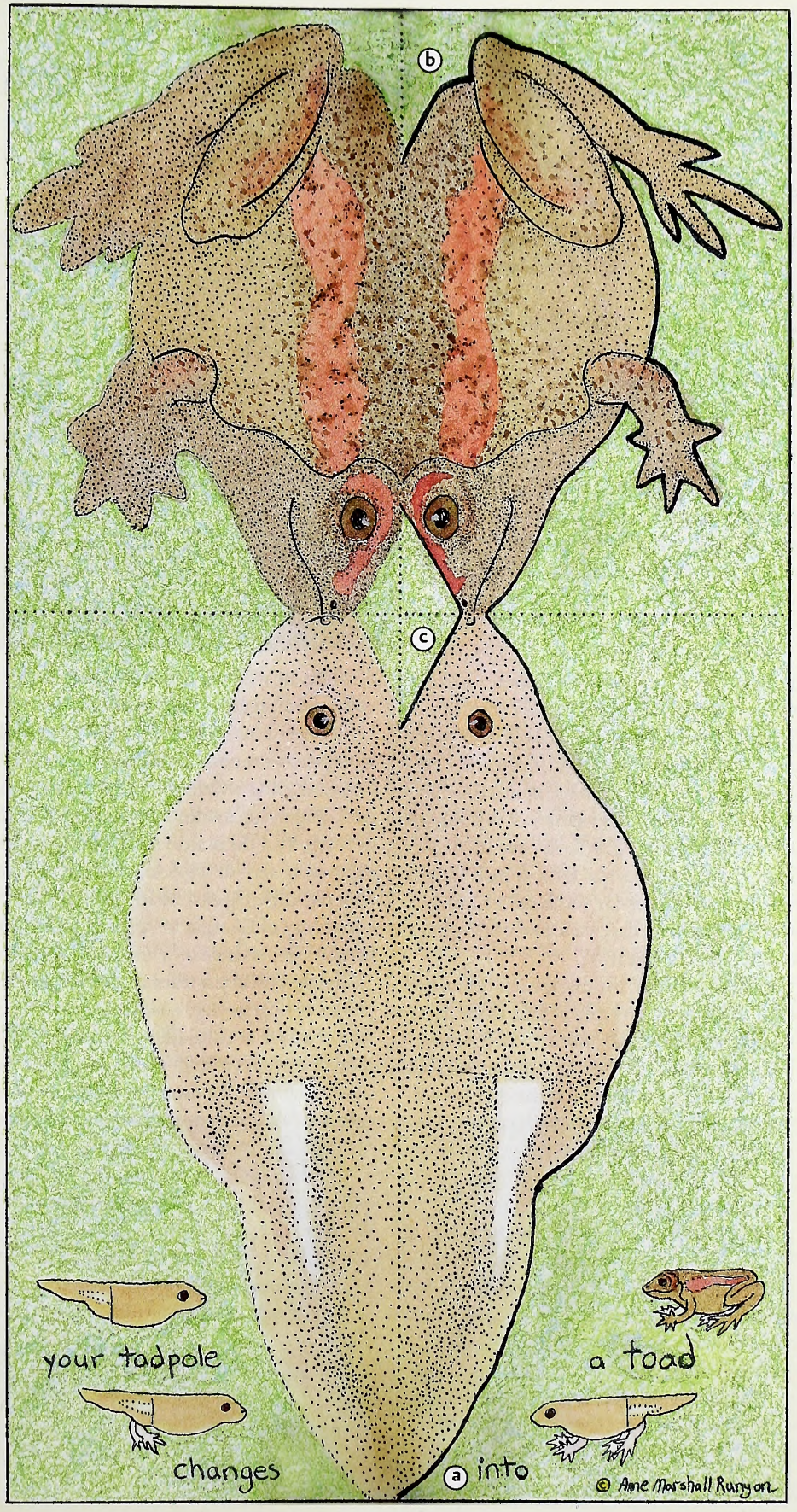
old each toad leg over body. *This llows legs to tuck inside when a tadpole.*

old tadpole over toad and fold in alf. *Be sure to keep legs tucked inside.*

nfold hind legs, then front legs, as adpole metamorphoses into toad.

low flip over and fold in half, toad n top.

uck tail inside and your tadpole has ecome a toad!



White-Nose Syndrome Found in N.C. Bats

White-nose syndrome, the disease that has killed hundreds of thousands of bats in the eastern United States, has been discovered in a retired Avery County mine, a cave at Grandfather Mountain State Park and a location in Yancey County, marking the arrival of the disease in North Carolina.

"White-nose syndrome is confirmed in Virginia and Tennessee, so we expected we would be one of the next states to see the disease," said Gabrielle Graeter, a biologist with the N.C. Wildlife Resources Commission. "This discovery marks the arrival of one of the most devastating threats to bat conservation in our time."

Although scientists have yet to fully understand white-nose syndrome, current knowledge indicates it's likely caused by a newly discovered fungus, *Geomyces destructans*, which often grows into white tufts on the muzzles of infected bats, hence the disease's name. The first evidence of this fungus was collected in a New York cave in 2006. Since then, it appears to have spread north into Canada and as far south as Tennessee, which reported its first occurrence last winter, and now North Carolina.

In the Northeast, the disease has decimated some species of bats and seems to be most fatal during the winter months, when hundreds of bats are hibernating together in caves and mines. It's not known if the disease will similarly affect all species in all regions of the country, though bat mortality and the diversity of species affected in the Northeast suggest the impacts will be significant.

In 2009, when it became apparent that white nose syndrome was spreading south, the Wildlife Commission developed and implemented a disease surveillance and response plan. The U.S. Fish and Wildlife Service (USFWS) consulted on the plan, helps fund surveillance efforts and assists with field work. The plan was designed to quickly document and communicate the occurrence of white-nose syndrome in the state to all concerned organizations and citizens.

GABRIELLE GRAETER / NCWRC

On Feb. 1, a team of Wildlife Commission biologists were conducting a bat inventory of a closed mine where they saw numerous bats displaying symptomatic white patches of fungus on their skin. Five bats from the mine were sent to the Southeastern Cooperative Wildlife Disease Study unit at the University of Georgia for testing, which confirmed the presence of white-nose syndrome.

In late January, a team of state, federal and private biologists were conducting a bat inventory of a cave at Grandfather Mountain when they discovered a single dead bat. Following state white-nose syndrome surveillance protocols, the bat was sent for testing, and it now has been confirmed for white-nose syndrome.

North Carolina is home to three federally endangered bats: the Virginia big-eared, Indiana and gray. Virginia big-eared bats are known from the Grandfather Mountain cave and have been seen in the Avery county mine, although not recently. Thus far, the disease has not been ob in Virginia big-e bats farther nor however, it has affected Indiana populations at i caves and mines North Carolina have Eastern sn footed, little br Northern long-e and tri-colored —all species th been affected by nose syndrome the Northeast.

"The discovery does not bode well future of many species of bats in wes North Carolina," said Sue Cameron w USFWS. "Although researchers are w hard to learn more about the disease, now, so little is known. There has bee evidence that humans may inadvert spread the disease from cave to cave, simple step people can take to help b stay out of caves and mines."

"Cavers are passionate about what t and we truly understand that asking to stay out of caves is no small reque we greatly appreciate their sacrifice, Cameron, noting that the western N Carolina caving club, Flittermouse G has been supportive of efforts to prote

The Wildlife Commission holds a tive easement on the mine, and both it Grandfather Mountain cave have bee and closed to the public for years to hibernating bats.

For additional information, visit t commission website at www.ncwildli

e NEWSLETTER
Get N.C. Wildlife Update—news including season dates, bag limits, legislative updates and more—delivered to your Inbox from the N.C. Wildlife Resources Commission. Sign up at www.ncwildlife.org/enews.

iaryland, Minnesota irm First Cases of CWD

h Maryland and Minnesota have ceived laboratory confirmations that tailed deer harvested in their states positive for chronic wasting disease). These are the first confirmed cases n state, and increase the number es with cases of CWD to 19. Two ian provinces, Saskatchewan and a, also have detected the disease. inning last year, Maryland focused pling efforts on Allegany and western ngton counties due to the presence tive cases in nearby West Virginia rginia. West Virginia first detected n Hampshire County in 2005 and ound in Frederick County, Va., in 010.

ginia also has announced that it has a second case of CWD less than 2 om the first case discovered last year e West Virginia line.

D is a slow, progressive neurological and nervous system) disease found

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

elk and moose in North America. ease ultimately results in death of cted animal. Symptoms exhibited by nfected deer include, staggering, al posture, lowered head, drooling, onfused, and marked weight loss. , no evidence that CWD can be nat- ansmitted to humans, livestock, other wild animals.

h Carolina has had no confirmed CWD in the state. For more infor- on CWD, visit www.ncwildlife.org/ g/H_CWD.htm.

Stewardship Agreement First of Its Kind in the Nation

The N.C. Wildlife Resources Commission has finalized an agreement with the National Forests in North Carolina that allows the two agencies to collaborate on projects to improve wildlife habitat—the first Master Stewardship Agreement in the nation between the U.S. Forest Service and a state agency.

"We are thrilled to join in this partnership that will allow proceeds from timber management to go back on the ground, into projects that improve wildlife habitat," said Mallory Martin, chief deputy director of the Wildlife Commission. "This agreement will allow our two agencies to collaborate early on to explore the best possible use of funds to benefit North Carolina's wildlife resources."

Stewardship projects can include wildlife habitat improvement projects, prescribed burns to improve forest health, watershed restoration or management and control of non-native invasive weeds and insects. Stewardship funds can be spent on resource improvement projects anywhere across the forest as previously determined within the collaborative process rather than being limited to the vicinity of the timber sale.

For more information on stewardship agreements, see the Forest Service's website at www.fs.usda.gov and search keyword "stewardship." For more information on the Wildlife Commission, visit www.ncwildlife.org.

NOAA: 2010 Ties as Warmest Year Globally

According to NOAA scientists, 2010 tied with 2005 as the warmest year of the global surface temperature record, beginning in 1880. This was the 34th consecutive year with global temperatures above the 20th century average. For the contiguous United States alone, the 2010 average annual temperature was above normal, resulting in the 23rd warmest year on record.

This preliminary analysis is prepared by scientists at NOAA's National Climatic Data Center in Asheville and is part of the suite of climate services NOAA provides government, business and community leaders so they can make informed decisions.

Combined global land and ocean annual surface temperatures for 2010 tied with 2005 as the warmest such period on record at 1.12 F (0.62 C) above the 20th century average. The global land surface temperatures for 2010 were the warmest on record at 1.80 F (1.00 C) above the 20th century average.

Global ocean surface temperatures for 2010 tied with 2005 as the third warmest on record, at 0.88 F (0.49 C) above the 20th century average.

In 2010 there was a dramatic shift in the El Niño-Southern Oscillation, which influences global temperature and precipitation patterns—when a moderate-to-strong El Niño transitioned to La Niña conditions by July. At the end of November, La Niña was moderate-to-strong.

In the contiguous United States, 2010 was the 14th consecutive year with an annual temperature above the long-term average. Since 1895, the temperature across the nation has increased at an average rate of approximately 0.12 F per decade. For additional information visit www.noaa.gov.

IN SEASON

This month, these seasons are open in North Carolina:

Roanoke River Striped Bass Management Area: Continues through April 30 unless closed by proclamation.

Wild Turkey (Male or Bearded Only): April 9–May 7.

Youth Wild Turkey Day (Male or Bearded Only): April 2.

There is no closed season or bag limit for groundhog, coyote, striped skunk, nutria and armadillo. There is an open season for taking beavers with firearms or bow and arrow during any other open season for the taking of wild animals.

Check the *2010–2011 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

CALENDAR OF EVENTS

Saturday–Sunday, April 2–3

Take part in the 32nd annual Trout Derby in Blowing Rock. No fee and no preregistration necessary. Prizes awarded for biggest fish in separate age categories. Eligible fish must be taken from Watauga County public waters.
Visit www.blowingrock.com.

Saturday–Sunday, April 16–17

Join the festivities and celebrate the shad run on Contentnea Creek at the 40th Annual Grifton Shad Festival.
Visit www.grifton.com.

Friday–Sunday, April 22–24

Learn about wild edible foods and herbs at the 36th annual N.C. Wild Foods Weekend at Betsy Jeff Penn 4-H Camp near Reidsville. Contact Debbie Midkiff e-mail debbiemidkiff@hotmail.com. or call (919) 489-2221.

Saturday, April 30

Enjoy a Songbird Celebration with bird-related classes, hikes and activities for all ages at Blue Jay Point County Park near Raleigh. Hours are 9 a.m. to 3 p.m. Call (919) 870-4330 for details.
Visit www.WakeGov.com/parks/bluejay/whatshappening.

Friday–Sunday, April 29–May 1

Check out the 12th annual Southern Side-by-Side Spring Classic at Deep River Sporting Clays near Sanford. Competitions will be held for side-by-side shotguns of various gauges. Exhibitors include such gunmakers as Atkin, Grant & Lang, Charles Boswell, FAMARS, Holland & Holland and Griffin & Howe.
Visit www.deepriver.net.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

Huebner New Enforcement Supervisor

GEOFF CANTRELL / NCWRC

Chris Huebner has been promoted to supervisor for administration of the Division of Law Enforcement with the N.C. Wildlife Resources Commission. His predecessor, Major David Stokes, retired Feb.1.

As a captain, Huebner served as state coordinator for hunting safety and boating safety, beginning in 2005. A Clayton resident, he will direct and coordinate administrative functions for wildlife enforcement and oversee statutory duties.

"While I will miss the important task of providing safety education to hunters and boaters, I look forward to the new challenge of being administrative supervisor," Major Huebner said.

Stokes began his career in wildlife enforcement in Cabarrus County in 1982 and worked his way up the ranks, culminating with the leadership role in the Raleigh headquarters.

"As a major, you realize pretty quickly how many people are vitally important to you, so you can get your job done," Stokes said. "Fellow officers, folks in other divisions and with other agencies, and the general public, all play a part. I owe them my thanks."

Labs, German Shepherds Top Dogs

The American Kennel Club (AK announced its nationwide regis statistics, revealing that for the 20th utive year, the Labrador retriever is t popular breed of dog in America.

This year's list included some ch in the top 10: the beagle overtook the retriever for the fourth spot, and th dog, which has been steadily rising i took sixth place away from the boxer dropped to seventh.

"Not since the early 20th centu the bulldog enjoyed such sustained larity," said AKC spokeswoman L Peterson. "'Bob' was the first AKC tered bulldog in 1886, and today th enjoys its highest ranking in 100 y

MELISSA M

TOP BREEDS

1. Labrador retriever	6. Bulldog
2. German shepherd	7. Boxer
3. Yorkshire terrier	8. Dachshu
4. Beagle	9. Poodle
5. Golden retriever	10. Shih T

Emergency Powers Granted

The N.C. Wildlife Resources Commission has approved a regulation giving the a executive director the authority to implement an emergency response plan in th of a wildlife disease outbreak that threatens irreparable injury to wildlife or the pub rule, which went into effect March 1, implements the emergency powers authorized N.C. General Assembly and written into state statute.

The emergency response plan would be developed in consultation with the gove office and the state veterinarian, as required by statute, and would allow the commis quickly regulate public activities in order to contain the disease. The plan would be e for 90 days following the commission's determination that a disease outbreak has oc unless a temporary rule is adopted within that time to continue the provisions in emergency plan.

The Wildlife Endowment Fund

An Investment for the Future

Established in 1981, the Wildlife Endowment Fund allows the Wildlife Resources Commission to accept tax-deductible contributions for wildlife conservation. Money from the sale of lifetime licenses is also placed in this fund. Your donation or purchase will ensure that North Carolina will have a rich wildlife heritage for generations to come.

Lifetime License Form

Infant and Youth *(check appraprioate block)*:

- ☐ Sportsman Infant $200
  (under 1 year old—Application must be received before applicant has attained 1 year of age.)
- ☐ Unified Sportsman/Coastal Recreational Fishing Infant $275
  (under 1 year old—Application must be received before applicant has attained 1 year of age.)
- ☐ Sportsman Youth $350
  (ages 1 through 11—Application must be received before applicant has attained 12 years of age.)
- ☐ Unified Sportsman/Coastal Recreational Fishing Youth $450
  (ages 1 through 11—Application must be received before applicant has attained 12 years of age.)

A copy of the birth certificate must accompany applications for infant and youth licenses. Birth certificate documentation cannot be returned.

Note: Pending satisfactory completion of the hunter safety course, persons who possess infant or youth licenses may exercise the privileges thereof when accompanied by an adult who is properly licensed to hunt in North Carolina. "Accompanied" is defined as maintaining a proximity to the hunter which enables the adult to monitor the activities of, and communicate with, the hunter at all times.

Adult (age 12 or older) *(check oppropriate block)*:

- ☐ Comprehensive Inland Fishing $250
  (N.C. residents only—includes basic inland fishing, trout & traut waters on game lands)
- ☐ Comprehensive Hunting $250
  (N.C. residents only—includes basic hunting, big game, game lands & N.C. waterfowl)
- ☐ Sportsman $500
  (N.C. residents only age 12 or older—includes basic hunting & inland fishing, big game, game lands, traut & N.C. waterfowl)
- ☐ Coastal Recreational Fishing $250
  (N.C. residents only—includes coastal recreational fishing)
- ☐ Unified Sportsman/Coastal Recreational Fishing $675
  (N.C. residents only—includes same privileges as the Sportsman, plus coastal recreational fishing)

A federal waterfowl stamp must be purchased separately for all N.C. hunting licenses.

Note: On or after July 1, 1991, a person, regardless of age, may not procure a hunting license or hunt in North Carolina without producing a certificate of competency for completing the hunter safety course or a hunting license effective prior to July 1, 1991, or by signing the statement below that he or she had such a license.

Check appropriate block and attach required copy:

- ☐ Copy of Prior Year Hunting License
- ☐ Copy of Hunter Safety Certificate of Competence
- ☐ In lieu of copy, I am signing the statement below:

Statement: I certify that I was a licensed hunter prior to July 1, 1991.

Signature _____ Date _____

Visit us online at www.ncwildlife.org or call 1-888-248-6834 for a complete list of lifetime licenses, including those for nonresidents and 65 and older.

Lifetime License

Complete the following information if applying for a lifetime license. Be sure to check appropriate block(s) on reverse side *(please print legibly)*:

Name of Applicant _____

Daytime Phone _____

Mailing Address _____

Resident Address _____

County _____ Date of Birth _____ Driver License # _____

E-mail Address _____

Is this license a gift? ☐ Yes ☐ No If yes, mail license to ☐ Donor or ☐ Applicant.

License Donor's Name *(if applicable)* _____

Donor's Telephone # _____

Donor's Mailing Address _____

City _____ State _____ Zip _____

Method of Payment: ☐ Check ☐ VISA ☐ MasterCard

Acct. # _____ Expires _____

Print name exactly as it appears on credit card _____

Cardholder's Signature _____ Date _____

Personalize your Lifetime License for an additional $5:
Indicate your selection of letters, numbers, dashes, periods, commas and /or blanks up to 6 spaces: ___ ___ ___ ___ ___ ___

Indicate your personal message including letters, numbers, dashes, periods, commas and /or blanks up to 21 spaces:

___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
___ ___ ___ ___ ___ ___ ___ ___ ___ ___

Signature of Applicant or Donor _____ Date _____

Note: Only adult lifetime licenses may be purchased by phone or online (VISA or MasterCard only). Call toll-free (1-888-248-6834) or visit us at www.ncwildlife.org. Use this form to purchase infant and youth lifetime licenses by mail.

Tax-Deductible Contribution

☐ I wish to make a tax-deductible contribution to the Wildlife Endowment Fund. Enclosed is my check for $_____. *(Credit card payments cannot be accepted.)*

Name _____

Daytime Phone _____

Mailing Address _____

City _____ State _____ Zip _____

Make checks payable to: *Wildlife Endowment Fund*

Transactions are not considered final until the check has cleared the bank. Items purchased with a returned check will be made invalid. A service charge of up to $25 will be charged on any returned check. (N.C.G.S. 25-3-506)

Mail completed application and payment to:
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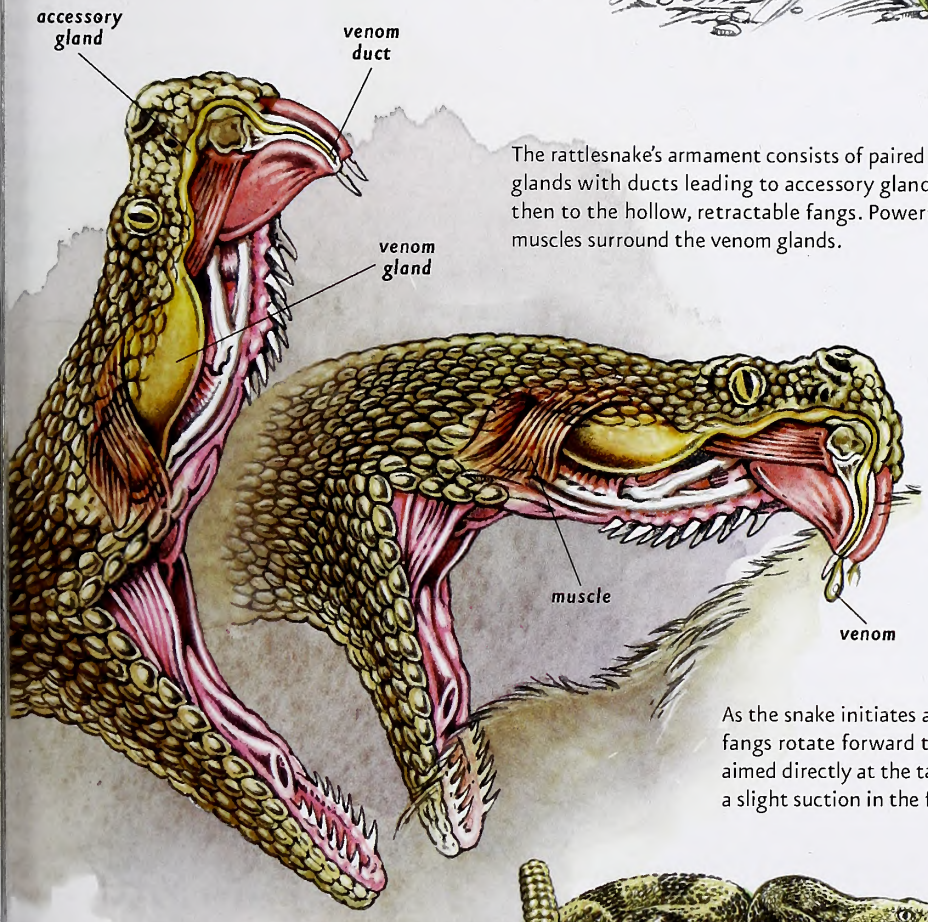
Office location: *NCSU Centennial Campus, 1751 Varsity Drive, Raleigh, N.C. 27606*
Telephone: 1-888-248-6834 (2HUNTFISH)

low Do Pit Vipers Inject heir Venom?

itten by Clyde Sorenson
istrated by Jim Brown

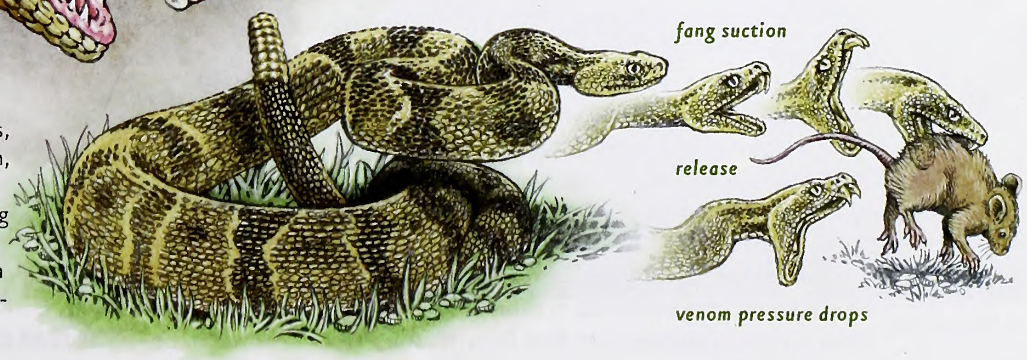
T VIPERS SUCH AS RATTLESNAKES, copperheads d cottonmouths strike fear in folks because of their dan- rous bites, but venomous snakes are armed with these emical weapons largely to help them acquire prey. The nom delivery systems of pit vipers like rattlesnakes e exquisitely efficient.



The rattlesnake's armament consists of paired venom glands with ducts leading to accessory glands and then to the hollow, retractable fangs. Powerful muscles surround the venom glands.

As the fangs penetrate the target, the muscles surrounding the venom glands contract, forcing venom through the primary ducts and into, and then through, the accessory glands. The accessory glands might contribute "activating" components to the venom, although this is unclear. The snake can regulate the amount of venom. Small prey receives less venom than large prey; strikes made in defense may deliver large amounts.

As the snake initiates a strike, the mouth begins opening and the fangs rotate forward to the fully extended position so they are aimed directly at the target. As they reach full extension there is a slight suction in the fangs.



:he snake withdraws its fangs, pressure in them drops again, haps clearing them of any aining venom and preventing crystallization in the fangs. st snakes have enough venom several bites before they tem- arily exhaust their supply.

Real Camping

written by Jim Dean

Most of us have been camping at one time or another. The idea of sleeping under the stars has a certain romantic appeal that seems clearly tied to freedom and simplicity. In our salad days, we thought nothing of heading for the woods with little more than a sleeping bag or blanket, dry matches, a skillet and some bacon, beans or burger that we planned to cook over an open fire.

JIM DEAN

We sometimes made a lean-to or simply rolled up in a tarp with our bedding inside and draped a second scrap of tarp over a frame of sticks to cover our heads if it rained. We considered it true luxury if we had an army surplus pup tent.

We called it "camping out," and considered it a worthy and satisfying challenge. The accumulation of years, however, tends to influence our notions of fun — if we thought nothing of such primitive camping then, most of us eventually reached the age where we thought even less of it.

"No experienced camper is ever miserable by choice."

In truth, "camping in" seems more fashionable these days, with many of us sleeping in pop-up campers or self-propelled RV units that also trail vehicles or haul bicycles and four-wheelers. Even the lowly tent camper is likely to have a large modern tent made of high-tech waterproof fabric that has standing headroom and several "rooms." We cook on propane stoves, keep food and drinks cold in electric, plug-in coolers and sleep in splendor on foam mattresses (that never leak).

I'm not poking fun at this because I have also come to appreciate an improved level of warmth, comfort and convenience. As I have noted before, Daniel Boone and later settlers of the American West would surely have crossed Cumberland Gap and the Oregon Trail in Winnebagos if such things had existed. No experienced camper is ever miserable by choice.

And yet, there is something to be said for those simple forms of camping we first knew. The trick is to combine a minimum of efficient gear with enough know-how to be comfortable — Appalachian Trail backpackers are masters at this.

My earliest adventures in camping took place when I was in the Boy Scouts. Alas, our troop had an uncanny knack for picking weekends to camp during a monsoon. At one camporee near New Bern, it rained so heavily that torrents of runoff washed our sodden lumps of bedding right out of our pup tents. What minimal pleasure we got out of this was largely the result of being rambunctiously young.

Some years later, when I was in the army, I contin ued to camp because that was the only way I could afford to spend my free weekends traveling to fishin spots. Whenever I had a little spare cash, I acquirec items that would enhance the experience. For $50, bought a new canvas Wenzel umbrella tent with stan ing headroom, mosquito netting on the door and window and a sewn-in floor. I also appropriated a old wooden-frame cot and a $2 surplus sleeping ba A small two-burner Coleman stove ($12) and a coo for about the same price completed my basic kit. A year or so later, I began to carry a folding chair, an eventually bought a freestanding tarp for about $20

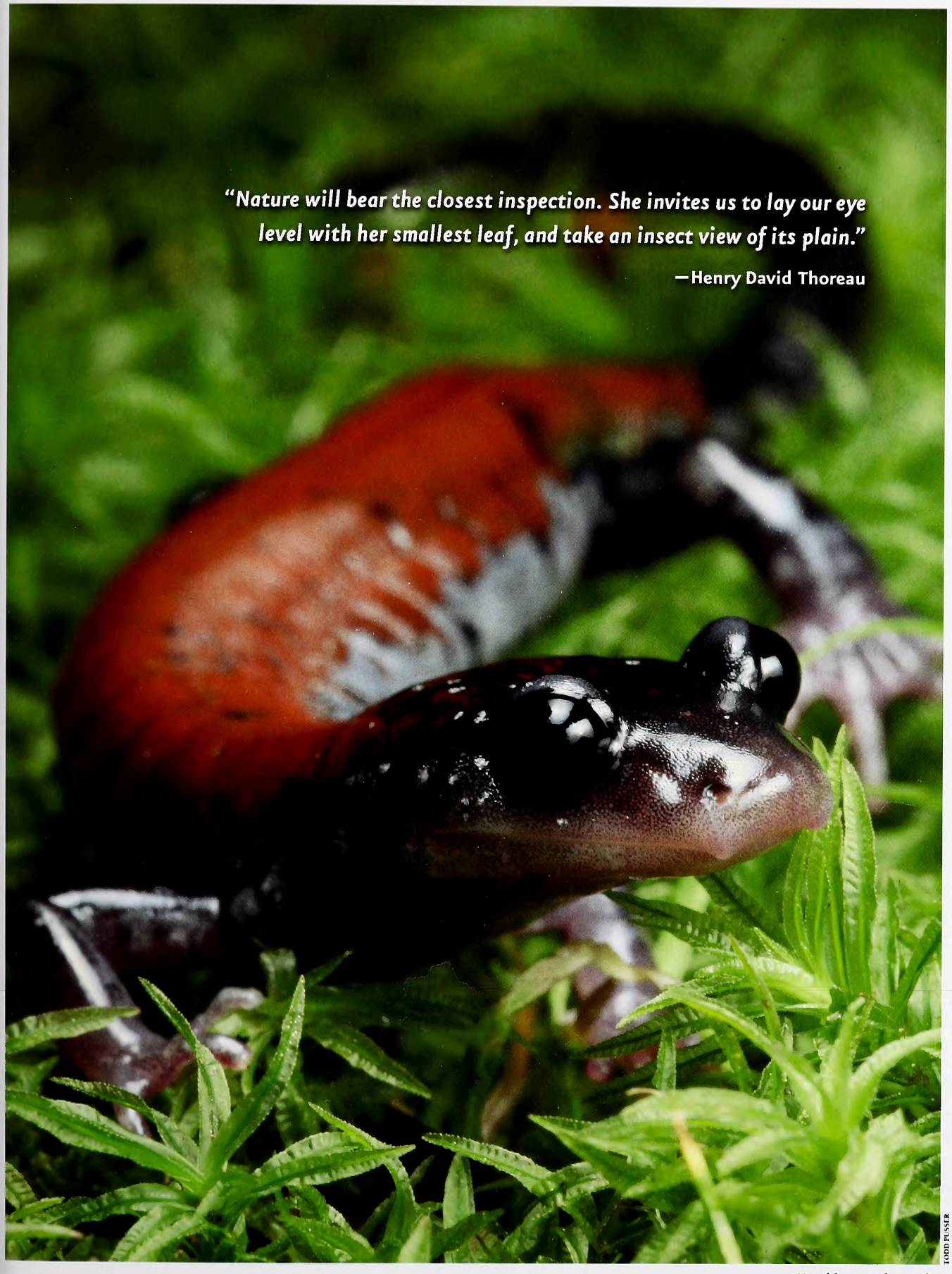
My only recent additions are a thin foam pad fo the cot and a newer sleeping bag — that old chicken plumage stuffed Korean War veteran eventually spli one night, and I emerged the next morning looking though I had been tarred and feathered.

Nearly 50 years have elapsed since I assembled the items, and I have camped far and wide with this origin gear. Nowadays, however, when I pitch camp, I get a l of strange looks and the occasional "How old is that ten I could afford nicer and certainly more modern gea now, but I don't need it. That old stuff still serves me just fine and, besides, canvas has a sweet, woodsy sme

I still occasionally encounter a fellow troglodyte w camps with gear that wouldn't have looked much o of place at Gettysburg. Last year in Idaho's outback spotted an ancient canvas wall tent with a stovepip through the roof hooked up to a cast-iron shepherd stove inside. It was a classic, comfortable elk-huntin camp that needed no improvements.

Then there's my old friend Chris Madson who is editor of *Wyoming Wildlife*. Some years ago, we campe for a week in Michigan in a vintage aluminum two- wheeled Sears & Roebuck trailer camper with a fol ing canvas top that he'd inherited from his parents. His father, John Madson, was a well-known conserv tion writer who worked for Olin-Winchester and al wrote many articles for *The National Geographic*, alo with some fine natural history books. For many yea through the middle of the century, John and Dycie camped all over the continent in this rig.

They nicknamed it "Hooverville," and if that ref erence isn't familiar, you're probably too young to ha savored the smell of wet canvas, either.



TODD PUSSER

OUTDOOR MOMENT

Yonahlossee salamander

IN THE MAY ISSUE

TODD PUSSER

GRAY TURNS WHITE

Brevard is not the only place in North Carolina with white squirrels — Rockingham County has its own population.

CACOPHONOUS

Periodical cicadas are coming, and together, thousands of them create a noise unlike anything else found in nature.

GOOD OLD BOAT

The Core Sound sink netter *Jean Dale* is fully restored at last, displaying the best of Down East fishing heritage.

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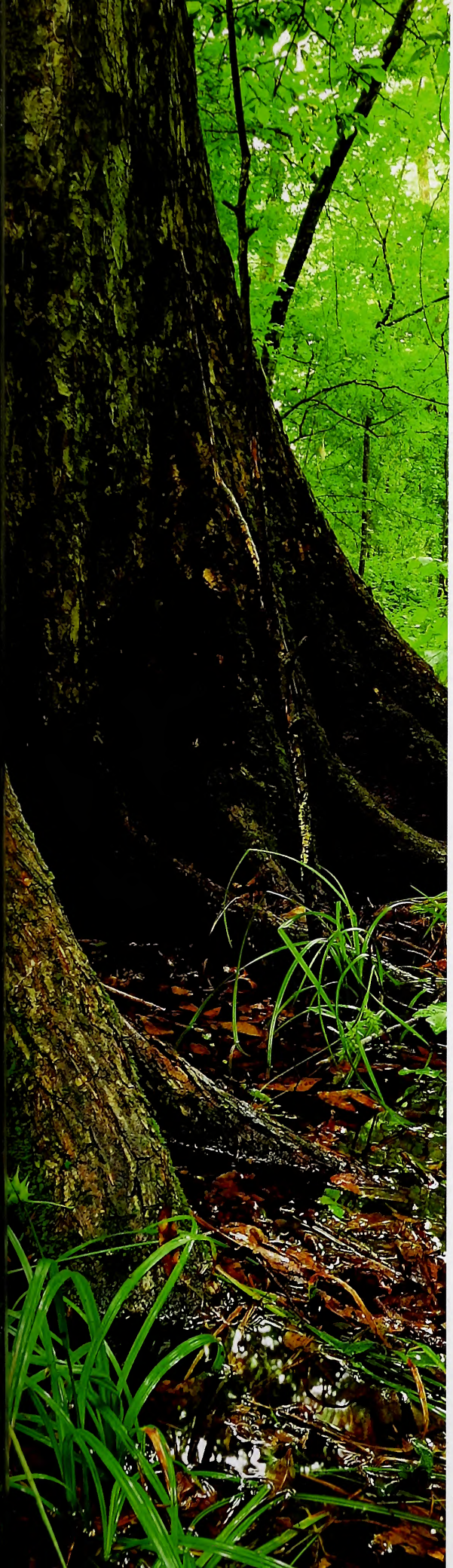
An American elm has developed a buttressed base to support itself in this Roanoke River natural levee, a natural community categorized as a Coastal Plain Brownwater River and Floodplain. **PHOTOGRAPH BY DAVID BLEVINS.**



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Cover: White squirrels in Rockingham and Brevard are not albinos, but are leucistic, a reduction in all types of skin pigment, not just melanin. **PHOTOGRAPH BY TODD PUSSER.**

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

Seasons change, and so does *Wildlife in North Carolina* magazine. In 1937, the magazine was little more than an eight-page, digest-sized newsletter—a collaboration between the N.C. State College zoology department and the N.C. Department of Conservation and Development. In 1947, the N.C. Wildlife Resources Commission was formed. The following year, the magazine became a monthly publication of the newly formed agency.

Recent trends in magazine readership and state government funding, as well as the occasion of our 75th anniversary, motivated us to take a step back and assess the way we operate. We needed a business model that would be sustainable through the changing times ahead.

As of the July issue, *Wildlife in North Carolina* will publish every other month. Six times a year, you will receive the same quality publication that this agency's magazine staffers have worked to produce for more than seven decades. In addition, subscribers will receive special fall and spring guides to the outdoors at no additional cost. These two guides will contain lots of content that will help enhance your hunting, fishing and boating experiences, including advertisements from providers of outdoor products and services.

Every subscriber who paid for 12 issues will receive 12 issues—it will just take a little longer to receive them. Likewise, every subscriber who paid for 36 issues will receive 36 issues. And all subscribers will receive the guides. In fact, subscribing to the magazine is the only way to get the guides, which we think will be an excellent complement to the content we already offer.

Also, we are considering offering online subscriptions to the magazine in the future. If we do, we will make sure that any electronic publication is up to the standards our readers have come to expect from *Wildlife in North Carolina*.

We are confident that you will appreciate these changes and the stability that they bring. I assure you that one thing will always remain the same: our commitment to bringing you, the reader, the best in outdoor writing and photography.

Greg Jenkins

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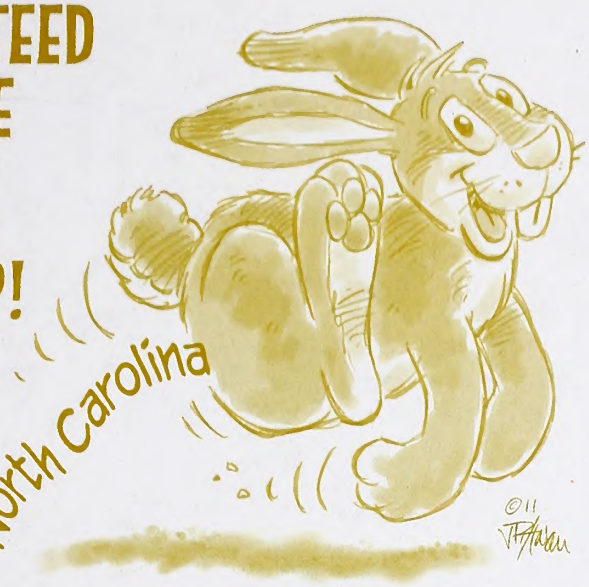

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e Tails and Tales

ed reading David Lee's article about snap-rtles ("Turtles with Attitudes") in your 2011 issue. He presented a lot of note-folklore and facts about these inter-creatures. I once saw an unwary sea gull a turtle-laden pond in Emerald Isle. The w of that gull, it was about a foot under-eing pulled down by one of those turtles. devotes part of his article to the sub-turtle meat in the American and Chinese e tells of turtle harvesting being a large s even now. Through all of his research t have come across some good turtle ecipes. Do you think he might share f them with us in a future issue?

Jerry Stockdale
Emerald Isle

vith interest the article in the March n snapping turtles. I was most surprised saw the insert stating that alligator g turtles don't live in N.C.

eral years ago in the spring, I was return-Raleigh with my wife, from our place at Island, and saw what I am very sure alligator snapping turtle. While I was to see this creature, I didn't think too f it. I assumed it was just a fortunate g, not that they don't exist in N.C.

location was Merrimon Road, a third of orth of where U.S. 70 turns east toward th River and Otway. This location is in over a culvert where water flows from large fields into a small marsh creek of water from North River. As we approached the curve, I noticed a large turtle crossing the road. There was no traffic, so I stopped and watched it pass in front of the car. It had a large head, a shell about 8–10 inches long, and a tail of 4–5 inches. What I specifically noticed was a most distinct saw-toothed ridge down the middle of the shell back, extending down the tail. I said to my wife, "That is an alligator snapping turtle."

I don't know what you will make of my observation. If you have thoughts that would confirm or refute my observations, I would be interested to learn them.

Joseph J. Hall
Raleigh

***Greg Jenkins:** Joseph, we probably should have said that alligator snapping turtles do not naturally occur in North Carolina. David Lee says that he hears about all kinds of odd non-native turtles seen and captured across the state each year. People like to move animals around, so perhaps it had some help getting there. Jerry, I haven't tried snapper meat and don't plan to, so we'll pass on the recipes for now.*

Chilly Dog

Thanks for a great article on Boykins ("Small Package, Big Dog," March 2011). They are really cool hunting dogs! But, you could have found a better photo for your cover. As much as I love a picture of a dog with a duck in its mouth, that poor pintail looks like he had either spent a couple nights in the deep freeze and/or been tossed to Mr. Boykin two dozen times. Regardless, keep the hunting articles coming!

Harry Archer III
Wilmington

***Keith Hendrickson, photographer:** It's a shame for your disappointment with the cover shot. My Boykin, Ruddy, was on a retrieve in the falling snow, with water surface temps right at freezing. The bird had fallen in marsh water containing 2 inches of slush, soaking its plumage as seen in the photo. Although not as visible in the boat shot used in the article, the wood ducks were also a bit worn and muddied. That happens while out hunting.*

Ravenous Reader

Just wanted to say how much I enjoyed and learned from the recent piece on crows and ravens and differences between ("Raven Renewal," Feb. 2011). A quite scholarly article. This is from one who usually scans through your mag once and casts it aside because, face it, content is mostly about the eastern half of North Carolina where wildlife subjects are more abundant. Now I am reading "The Great Imposters" and other articles in the March issue, and I'm not even what you would call a birder. In other words, you're doing good work; keep it up.

Richard Seiler
Brevard

Who's on Top?

I have thoroughly enjoyed reading your magazine ever since we moved to North Carolina, a few years ago. Love the photography, too. However, one thing caught my eye in your March issue's Editor's Note. I very much agree with your premise about all animals, even the yucky ones, being part of our world. However, your comment about man's enviable spot at the top of the food chain, gave me pause. I pose this question to you. If you and a 9-foot, 800-pound polar bear were on an ice floe together (you unarmed, of course) who would be at the top of the food chain then?

I have always read that polar bears and probably grizzlies, too, are the top predators! Food for thought! (Pardon my pun.)

Elaine H. Bednarcik
Sanford

***Greg Jenkins:** Elaine, my scenario assumed an armed human. I guess the result might also depend on whether a killer whale decided to leap up on the ice floe for a cold bear-human snack.*

rite us

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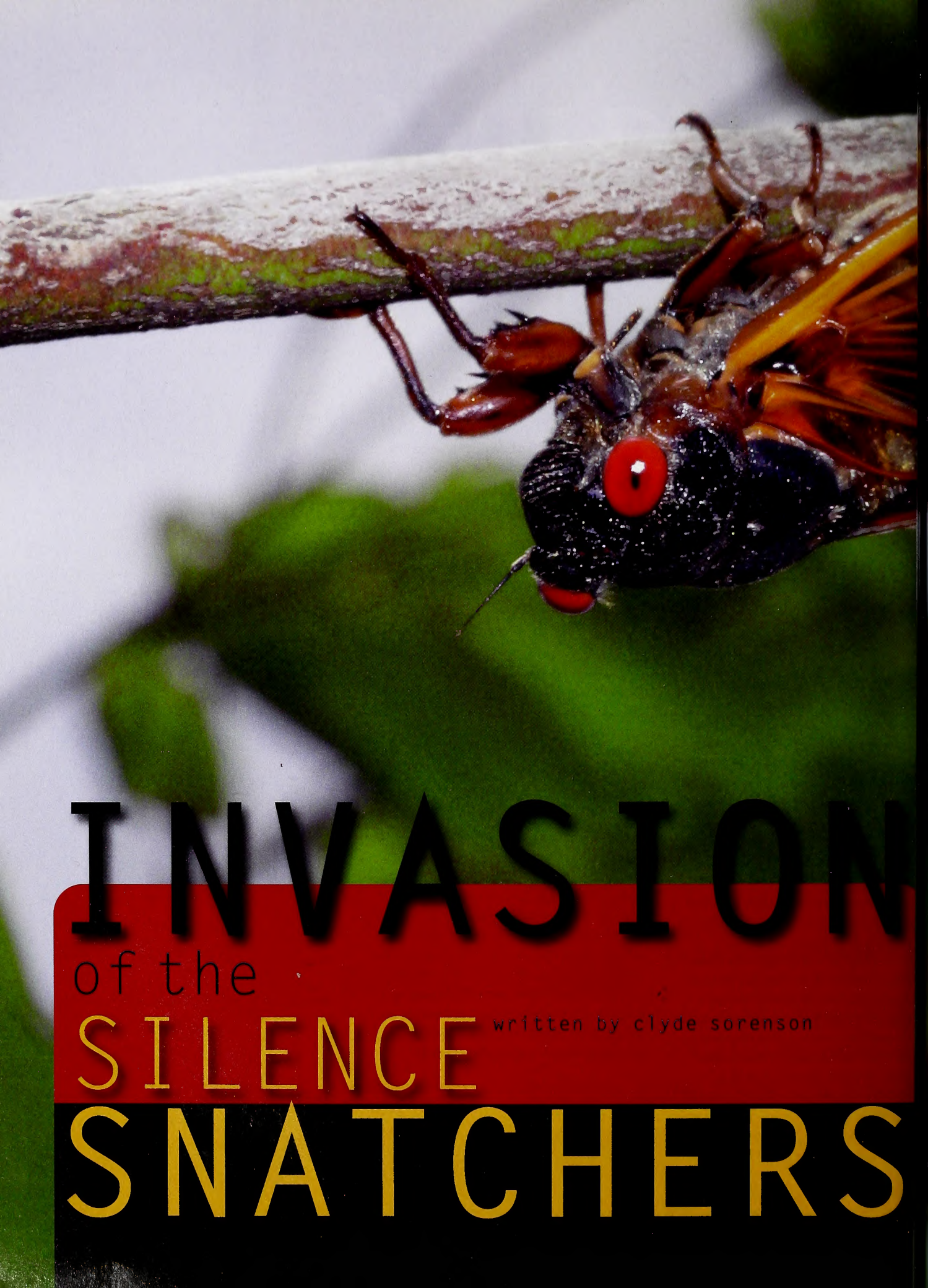


INVASION of the SILENCE SNATCHERS

written by clyde sorenson

Periodical cicadas appear this month, creating a deafening noise and leaving behind millions of empty shells. DON'T MISS THIS AMAZING SPECTACLE that comes only once every 13 years.

By the time you read these words, THE INVASION WILL BE ON. The invaders, in their millions, will be dangling from almost every twig, in almost every tree, bright red eyes shining and orange-veined wings glistening. Weird, dust-colored little alien husks, each disturbingly split neatly up the back, will be grasping the trunks of trees and stems of bushes by the hundreds, mute and slightly unsettling testimony to the teeming hordes in the trees.

And the invaders will be calling—at least half of them, anyway—around the clock, with deafening crescendos interspersed with all-too-short, promising periods of quiet. There is nothing one can do to stop it, and nothing one can do to make them go away. The *Magicicadas* are here, so we might just as well enjoy this strange and overwhelming visit while it lasts.

The last time they made their appearance here, Jim Hunt was the governor and David Letterman's mom had just finished her broadcasting gig at the Winter Olympics in Nagano, Japan. For folks living near or in many wooded areas in much of the western two-thirds of North Carolina, the emergence of the Great Southern Brood, or Brood XIX, of the four species of 13-year cicadas is already a fact of life, and one that is impossible to ignore. Periodical cicadas emerge in different geographic areas synchronously and en masse. The emergence in a given area for a given year is called a brood, and for the most part, broods don't overlap geographically.

At least six broods extend into different parts of North Carolina. Brood XIX covers the greatest geographic extent of any brood, reaching from Maryland to Georgia and west to Oklahoma. The densities of the insects can exceed 1,500,000 per acre, although 100,000 per acre might be more typical. Periodical cicadas average about 450 milligrams each in weight, so a density of 1,500,000 works out to about 1,400 pounds of cicada per acre. Right now, there are billions of the insects in North Carolina—an exuberant display of nature's power to conjure biomass.

Periodical cicadas, some of the marvels of the natural world, are found in eastern North America and nowhere else on the face of the globe. There are seven species total—four with a 13-year cycle, found more to the south, and three with a 17-year cycle, found more to the north.

THE GREAT SOUTHERN BROOD RANGE

Periodical cicada Brood XIX spans across the Piedmont of North Carolina as well as parts of the foothills, the far western Mountains and 11 other Southern and Midwestern states. The brood's distribution as shown on the map is approximate.

Periodical cicadas excavate holes (above) and emerge from their safe underground homes to molt, mate (below) and die just a few weeks later.

The mass, synchronized emergence of these creatures completely swamps potential predators, including a huge range of birds, rodents and other mammals, and many other animals, in a sea of food. Most adult cicadas avoid predation simply because anything that might eat them is probably already full of them.

Any predators that might evolve to exploit the astounding abundance of 13- and 17-year cicadas would have to have appropriately long life cycles and synchronize with local populations of cicadas. Shorter life cycles would only rarely line up with the cicada cycles. It appears that none have been able to do so, and the "predation satiation" strategy appears to work fine for the potential prey. Because their sheer abundance protects them, periodical cicadas are much less wary than other cicadas, and they can call with relative impunity all day, unlike others that restrict their calls to periods when potential predators aren't active.

A Cicada's Life

Periodical cicadas, like all cicadas, are completely harmless to humans — if you don't count the sometimes near-deafening noise of the chorusing males — although some people regard them with trepidation because of their appearance and abundance. A cicada starts life as an egg, carefully inserted with a batch of others into a twig on a hardwood tree by its mother. She uses her sawlike ovipositor to open a slit in the wood for the eggs. In the process, the leaves outboard of the wound often wither and die due to the disruption of the vascular tissue in the twig. In a heavily assaulted tree, this damage can look dramatic, but it appears to do little lasting harm to healthy, mature trees. Each female produces about 500 eggs, in batches of 20 or so.

After one to two months, the egg hatches, with its countless millions of kin, and the tiny nymph drops to the ground. Over additional weeks, the minuscule creature burrows down into the soil, where it seeks a tasty tree rootlet to call its own. It then settles down to feed, molt and feed some more — for almost 13 years.

Then, if the cicada nymph has managed to survive the intervening winters (and perhaps floods and drought), and if its woodland has escaped the developer's blade, it will journey back to the soil surface and excavate an escape tunnel. One night, when conditions are just right, it will crawl [to] the ground and up the nearest tree tru[nk] molt one last time. The creature that l[eft] that alien-looking brown husk is a gh[ost] white apparition. Slowly, over the cou[rse] the night, the cicada's exoskeleton ha[rd]ens and darkens, and it greets the morning [red] eyed and sparkling orange and black, [ready] to call, mate and, in a few short weeks [to] die.

It is only the males that call, and, of [course] they're calling for the benefit of nearb[y] females. They have a more complicated [ver]toire than you might suspect. The mo[st] quent song is their calling song. A m[ale] approaching a female has courtship s[ong] that he uses to try and convince her t[o] and the songs change as consummat[ion] approaches. He'll shut up completely w[hen] is finally successful. Males also have a[n] buzzing alarm call if they feel threatened.

Cicadas produce their songs with s[ome] of the most efficient and effective sou[nd] producing devices in the animal kingd[om] structures called tymbals. Tymbals ar[e] ridged plates in the exoskeleton of th[e] abdomen. Attached to the tymbals are m[us]muscles, and surrounding the tymbals [are] sacs that function like amplifiers. The[se] cles are of a special type; they contract [mu]ple times for each nerve impulse, giving [them] the ability to cycle at incredibly high r[ates] up to 1,000 times per second. As the m[us]flexes, the plate is deflected, making a p[op] sound (much like those annoying click[ers] kids get at the State Fair). As the mu[scle] relaxes, the plate rebounds, making a[nother] popping sound. The animal can contr[ol] pitch and volume of the sounds by contr[acting] additional muscles that change the sh[ape] the abdomen slightly, giving the cicad[a] ability to make a huge range of differ[ent] sounds with a very simple kind of instr[ument].

With this equipment, cicadas mak[e] loudest sounds in the insect world a[nd] indeed, some of the loudest among al[l] mals. Some of our annual, or dog-day, [cic]use this ability to drive off predators. Approached by a threatening bird, th[ey] screech loudly enough, and at just th[e] pitch, to cause physical pain. Individu[als] some tropical species can be heard fro[m] quarters of a mile away.

NATURE'S WAYS

How Do Little Cicadas Make Such Loud Sounds? See Nature's Ways, page 3

RACHEL PARDO

RICHARD LEUNG

Cicadas molt shortly after emerging from the below-ground homes they have occupied for 13 years. Their distinctive black and orange color pattern is similar across the three species of periodical cicadas in North Carolina.

ugh periodical cicadas aren't the loud- effect of thousands calling together in s of the trees in your yard certainly e described as deafening. Males of each hree species have their own calling and ip songs, and the females are attracted the sounds of the males of their . The most common of the three 13- ecies found in North Carolina, *cada tredecim*, appears to be saying oh!" and the other common species, *cassini*, has a calling song that consists ies of clicks followed by a buzz. The ecies you might hear in North a, *M. tredecula*, produces an acceler- ries of chirping sounds.

u listen carefully, you might be able to uish two, or perhaps all three, of the in the woodland chorus. The species d to call at different times of day— n in the morning, *tredecula* in mid- *decassini* in the afternoon—although be heard to some extent all day. You separate the species by minor differ- their colors and size: *M. tredecim* is gest, with broad orange stripes on omen; *M. tredecassini* is smaller, lack abdomen; and *M. tredecula* is allish, with narrow orange stripes on omen.

cada Hunt Gone Awry

gh those of you fortunate enough to e cicadas in your neighborhood may tire of the racket, you can take some n the fact that they will be around for ut six weeks, with peak numbers for ree. Since my home is in northern n County, I live too far east and south hem on my property. Indeed, there are no broods that extend any great distance into the Coastal Plain. Perhaps this is because 300 or 400 years ago, most of the Coastal Plain was either longleaf pine savanna or swamp forests and pocosins—habitats that don't offer much to insects that prefer hardwood tree roots for most of their lives.

If my family and I want to experience periodical cicadas (and, as a professional entomologist, I do), we must head west to see them. In June 2004, we made a trip to the mountains near Linville Gorge, where I had seen large numbers in 1987, to try to find the 17-year cicadas of Brood X. I wanted my kids to experience the sheer numbers as I had years before. Things did not go as planned.

We headed up N.C. 181 from Morganton toward Linville, looking for the telltale flagging in the trees and listening for the chorus the whole way up. But we saw only a few dead, brown-leaved twigs and never heard the first cicada. We took the Blue Ridge Parkway north, hoping that maybe with some elevation we'd encounter some of the insects. North of Grandfather Mountain, we pulled off at an overlook, and the four of us (my wife, Lee; my kids Eric, 13, and Anna, 9, and I) struck off down a trail to a waterfall, thinking that if we couldn't find cicadas, we could certainly find a cascade. Hiking back out, Lee's right foot slipped on a wet, mossy rock, and she stumbled forward. I heard a sickening crack as she yelled in pain and fell, her ankle bending in a direction that ankles normally don't bend. She had shattered the bottom of her right tibia.

We were in a real bind. My wife is not a large woman, but the kids were too small to help carry her. I tried taking her on my back in a single fireman's carry, but the trail was too steep and rugged, and I risked injuring her further. So I parked her by the side of the trail with the kids, and I started jogging out to the car to call a rescue squad.

About halfway there, I bumped into another hiker and asked him if he had a blanket or some such thing. "Not on me," he responded, "but I do have one in the car." I'd never heard sweeter words.

We grabbed the blanket and trotted back down the trail. With two stout dead limbs and the blanket, we were able to fashion a sturdy stretcher. We got my wife onto the makeshift litter and started out. Soon, two more hikers caught up with us, and the four of us easily carried her out to the car. A call to a nurse friend reassured us that she could make it to Greensboro for medical attention.

Driving just east of Wilkesboro, I pointed out the abundant flagging in the trees. "Go ahead and take a look," Lee said. And sure enough, there were still a few cicadas lingering in the trees along a side road. We finally got to see them, but their glory was past. We were too late. And Lee still needed to get to the hospital.

My wife has three titanium screws in her leg as a memento of our last cicada expedition, but she's game to go looking for them again this year. Alas, my kids are now older and doing their own things, and I'm not sure I can corral them for another cicada hunt, even though we'll have to go only 30 miles this time. If you have young children, don't miss the chance this year to experience this wonder of natural history with them. Your kids won't be kids when the cicadas next return. ◆

N.C. State University professor Clyde Sorenson is a regular contributor to WINC.

Jean Dale LIVES AGAIN

Against a backdrop of fishing decline and other coastal woes, the restoration of a legendary fishing boat prompted a grand celebration of the Harkers Island boatbuilding heritage.

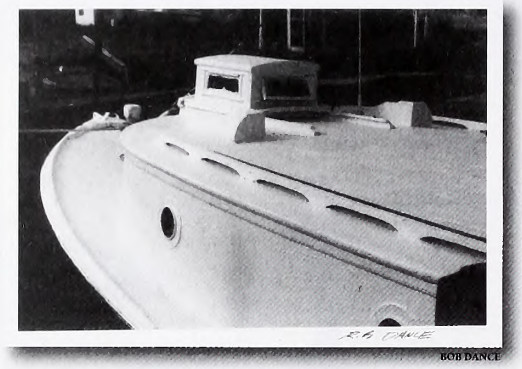
WRITTEN BY LAWRENCE S. EARLEY

LAWRENCE S. EARLY

LAWRENC

BOB DANCE

BOB DANCE



BOB DANCE

The graceful lines of the *Jean Dale*, with her rounded stern and flared bow, has captivated artist Bob Dance for more than 40 years. Dance photographed her often while she was still working, and has used her as a subject in his paintings numerous times. His most recent *Jean Dale* work, "Cape Lookout Classics" is on the previous page.

All day long they came, singly and by the carload—men, women, children. There were fishermen and boatbuilders, residents of Harkers Island and off-islanders. They had a celebration on their minds, and they went about it with gusto, gazing at the pretty workboats that had been trailered into place outside the Core Sound Waterfowl Museum and Heritage Center on Harkers Island, wolfing down mullet and bluefish, slaw and hush puppies and sipping sweet tea. Inside the museum, they talked to boatbuilders and examined displays, photo albums, videos and artifacts that demonstrated the tradition of island boatbuilding. And then they wandered back outside again to gawk one more time at the main reason for the festivity, the old boat herself, the legendary *Jean Dale*. They peered at her from all sides as she sat under the open shed, they took in her beautiful lines and her brilliant coat of white paint, and they nodded in appreciation of the phoenixlike symbolism she represented.

They were there on Sept. 11, 2010, chiefly to celebrate the restoration of *Jean Dale*, a workboat that more than any other has come to epitomize the craftsmanship and ingenuity of the Harkers Island boatbuilding fraternity. Built in 1946 by Harkers Island boatbuilder Brady Lewis, with the assistance of Burgess Lewis, the boat had come on hard times, as all wooden vessels eventually do. Unlike most, however, she had been given a chance to have her good looks restored. The last touches had been administered just a f before by boatbuilder Jimmy Amspach had taken on the restoration project single-handedly, with help from islan Brooks, master boatbuilder Jamie Lev son James and Amspacher's daughte

And of course they would have a c nity celebration to mark the occasion what the Core Sound Museum does s although this would be a special gat with another aim as well: to fill the pe this hard-pressed community with re pride in their long heritage of boatbu

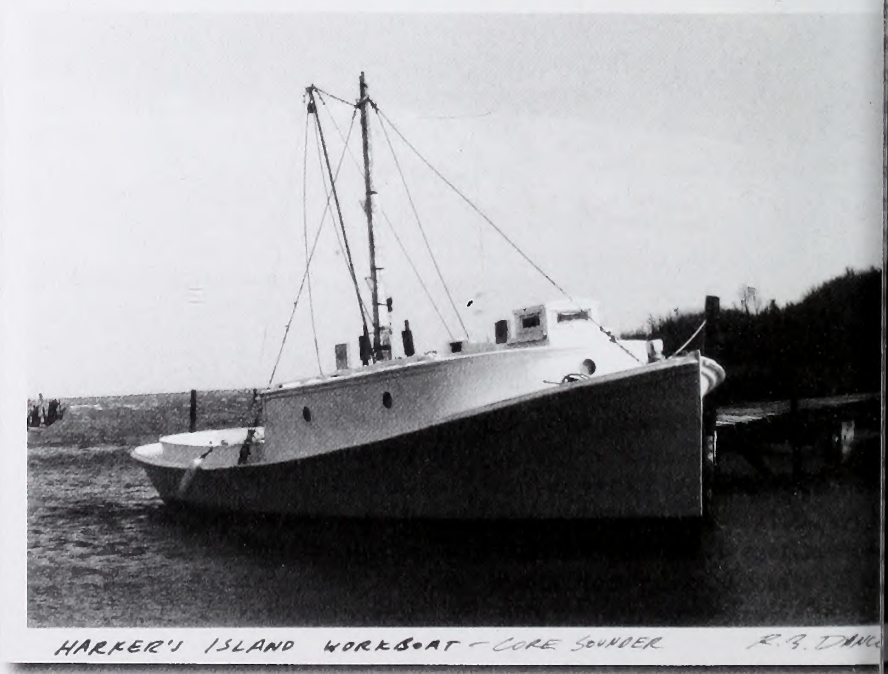
A tattered beginning

What a wreck she was when she first to the museum! The family of Harry who had owned and worked the boat she was built, donated *Jean Dale* to museum in 2000. As an old wooden she showed evidence of 55 years of w life and had tales to tell: Indeed, she a burned up once while at work, and sh sunk at least twice.

"There's something that people do understand about old boats," said Pam collections coordinator of the museum are very fragile things, and this one w to start off with. The motor didn't ru was in bad shape."

When the formalities of the Lewis f donation were finalized, Morris calle host of island friends and contacts to *Dale* transported to her new home. S George Brown strap the boat up and

THEY PEERED AT HER FROM ALL SIDES AS SHE SAT UNDER THE OPEN SHED, THEY TOOK IN HER BEAUTIFUL LINES AND HER BRILLIANT COAT OF WHITE PAINT, AND THEY NODDED IN APPRECIATION OF THE PHOENIXLIKE SYMBOLISM SHE REPRESENTED.



ut of her berth at East Bay Boatworks
s crane. Randy Ramsay of Jarrett Bay
rks donated the services of his
lic trailer and a crew to carry the boat
useum and unload her.

Dale had a home, but barely: There
footing for her, nor was there a roof
r head. Over the next few years, as
ey was raised, a cement slab was laid
ofed shed was built. There she sat for
ore years while the museum building
s being constructed and while director
Willis Amspacher was struggling to
ugh financing to keep the electricity
on and get the exhibits developed.
in late 2009, the Bob and Suellen
oundation provided long-term finan-
port for the boat's restoration and
Jimmy Amspacher to do the work.
was rotten when she first came here,"
ledged Amspacher. "The first thing I
lo was try to get her back to square. I
it for almost two years trying to get
in shape. I do things a little different
er people. If you start out wrong, you
wrong. You have to get something
back to the center of the keel to get
e back, that's what took so long."
the boat was back to square, he set
scraping the paint off and exposing
d timbers. He'd find one and pull it
y to discover two or three more.
lly, he had to replace almost all of her
"Some of the bottom boards are orig-
e said, "a few boards on the sides,
from the deck up." About 80 percent
at had to be rebuilt.

acher's wood of choice was Atlantic
dar, called juniper in eastern North
a. Traditionally, boatbuilders used
pine heartwood for the keel and frame
iper for the planks and decking.
wood is plentiful any longer, but
though expensive, is easier to get
rt pine. "If you can come up with 3
ars a foot, you can get all the juniper
t," Amspacher noted dryly.

an look at *Jean Dale* now and see the
of the old Core Sounders: a low cabin,
oghouse" on top used by skippers in
t weather and a rounded stern. She
net boat. Sink-netters fished around
hern part of Core Sound, and they
worthy enough to venture into the
ound Cape Lookout as well. Her best
ature, one that was common to sev-
s built in the late 1930s and early '40s,

PHOTOGRAPHS COURTESY OF CORE SOUND MUSEUM

When the *Jean Dale* arrived at Core Sound Waterfowl Museum and Heritage Center on Harkers Island, the years had taken a toll on her. The boat had so much rotten wood that boatbuilder Jimmy Amspacher, who restored her, replaced about 80 percent of her planks after she was removed from the water and placed in dry dock.

was an innovative design—a "flared" bow. Many of the boats traditionally built in the area had sailboat or sharpie lines, featuring a straight-sided or "slab" bow. Brady Lewis' great innovation was the use of strip planks of varying widths to achieve graceful and complex curves in the frames. There is some argument about whether the flared bow kept water from the deck or not, but there's no argument that a flared bow made a pretty boat.

Over the next half century the flared bow became the trademark of Harkers Island boatbuilders. The reputation of their wooden boats surged, and Brady Lewis' renown grew as well.

PHOTOGRAPHS COURTESY OF CORE SOUND MUSEUM

PHOTOGRAPHS COURTESY OF CORE SOUND MUSEUM

Katie Amspacher (top) assisted her father, Jimmy (center), in working on the *Jean Dale*. The entire restoration took about 10 years, from the date of the donation of the boat by the family of boat owner Harry Lewis to its completion in 2010. Artist Lena Ennis (bottom) adds the finishing touches by painting on the boat's name.

Today *Jean Dale* is celebrated as the prettiest and most graceful of all the Core Sounders.

One who was especially taken by the boat's beauty was painter Bob Dance of Kinston. *Jean Dale* has turned up in many of Dance's most famous paintings over the years. "I first saw her in the late '60s, early '70s," he said. "I'd vacation in Morehead City and ride all over the coastal area looking for subject matter. I ran across the *Jean Dale* on the far end of Harkers Island, when it was mostly just a working boat area. I saw her in her last working days going by the point where the ferry goes to Cape Lookout. She'd be plowing along, going home after a day's work. The lines of the boat were just beautiful."

Dance said she's appeared in probably 20 or 30 of his paintings, not always under her correct name. Probably his best-known painting, one that has appeared in *Wildlife in North Carolina* several times, is "Cape Lookout Morning," the *Jean Dale* looking a bit rust-stained as she worked in front of the Cape Lookout lighthouse.

As the boat began to show signs of deterioration, Dance joined his voice to others' urging that the boat be acquired by a museum. "I began to think of her as the most famous boat in North Carolina," he said. "I tried to get the N.C. Museum of History interested in her because I was convinced toward the last that the boat could not be saved. It looked like a piece of dry-rotted junk. Jimmy Amspacher really deserves a lot of credit."

Part and parcel

On the afternoon of the Sept. 11 celebration, Karen Amspacher, the director of the Core Sound Museum and Harkers Island's most passionate advocate and defender, convened a panel of noted Island boatbuilders in front of a large audience for an hourlong appreciation of the legacy of Harkers Island boatbuilding. "The *Jean Dale* is part of who we are," she said in her introduction of the panelists, who included Lee Willis, a small fleet of Lewises—brothers Houston and Jamie Lewis, and Jamie's son James (sons and grandson of the Burgess Lewis who had helped build the boat)—and Linwood Parker, who owns Parker Boats of Beaufort and grew up on Harkers Island. Jimmy Amspacher spoke, and other boatbuilders in the audience did as well. It became a memorable afternoon of laugh-filled and heartfelt reminiscence.

Linwood Parker remembered that when he was a child, boatbuilding was everywhere on Harkers Island. "We would walk the shore, around the nets spread fro end of the island to the other," he said. were probably at least two dozen pe building boats from scratch. At the co store you'd overhear conversations abo was building what, the boats' dimensi the stages of construction that they w And when the boat was launched, in critiques were offered: Too high on th Just right. Shear looks good. Shear do look good," Parker recalled.

The boats were made of wood at th but nowadays most boats are made of glass, and their "slick" finishes are wh tomers want. "We had to compete w fiberglass boats, and they were just lik you know," said Houston, ruefully. "It to get a wooden boat like glass." Buil wooden boats who want to achieve a finish must use successive layers of p each of which needs to be hand-sande progressively fine-graded sandpapers to, you could build one in five weeks. now it would take three or four time long as that just to get her slick," Hou said. They're more labor intensive and more expensive.

In recent years, added James Lewis, built very few workboats. We built a f the last couple of years for some local but nowadays it's all sport boats. You're about a whole different boat when y building a sport boat."

Members of the audience recalled boatbuilding icons as Earl, James and Rose, Guy Gaskill and Jimmy Jones. Merkley and his 9-year-old son, Lar stepped up to the microphone and de how most Sundays, after church, they come to the museum to look at the *Jea* and see how she was coming. Many over the years they were disappointed b it seemed like nothing was happening now we can see that it's a beautiful bo it's part of our history," said the elde Merkley. "And I'm telling the fellas he build some of the best boats, the most ful boats there are, and someday the going to be gone, and we need to appr them and love them—not only the b but the people."

Boatbuilding tradition

Over the years, many notable wooden have come and gone from the little D East fishing villages of Marshallberg

MICHAEL STARKS

MICHAEL STARKS

MICHAEL STARKS

Bob Dance (top center) was part of the festivities last September when the museum hosted a celebration of Harkers Island's boatbuilding legacy and unveiled the restored *Jean Dale*. A panel that day included boatbuilders (from left) Lee Willis, Linwood Parker, Houston Lewis, Jamie Lewis and James Lewis.

ATERIALS AND METHODS OF BOATBUILDING HAVE
NGED; THE OLD TRADITIONS OF BACKYARD
BUILDERS USING THE "RACK OF THE EYE" TO ACHIEVE
R REMARKABLE DESIGNS ARE ERODING AND MAY WELL
PPEAR IN A GENERATION OR TWO.

ster, Williston and Smyrna, Atlantic level, as well as Harkers Island. The ls and methods of boatbuilding have l; the old traditions of backyard boat- using the "rack of the eye" to achieve narkable designs are eroding and may appear in a generation or two. In this , the very survival of the *Jean Dale*, as much as her glittering restoration, y significant and important.

Karen Willis Amspacher and her n staff, the celebration that was cen- *Jean Dale* and the heritage of Harkers oatbuilding was just as much about the nity that is gradually forming around eum as about the boat itself.

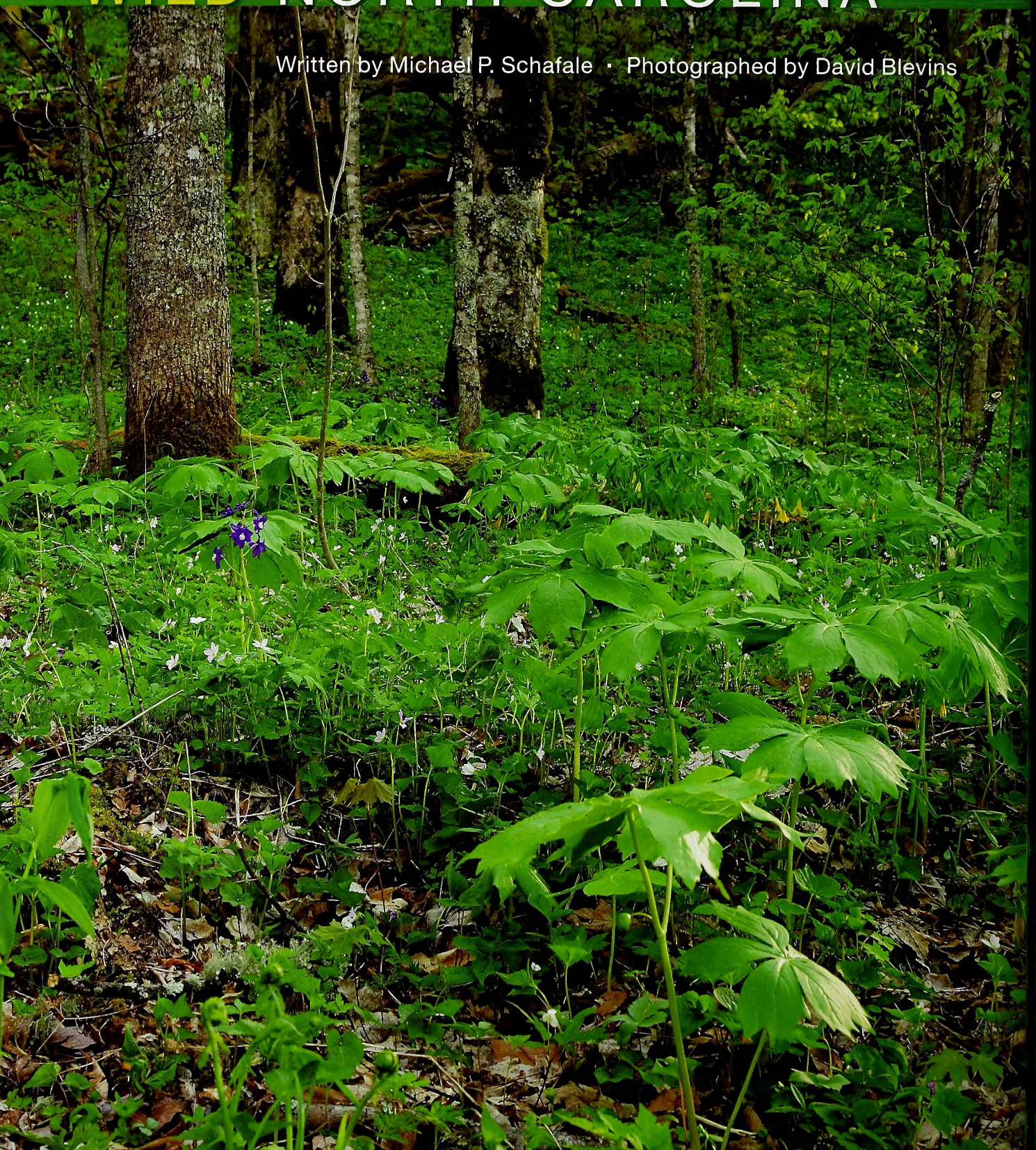
nk the *Jean Dale* was critically impor- Harkers Island," Karen Amspacher very time we have something at the n that draws people in, it helps them and that the museum is all about the nity. In the past 15 years, there's a real from the old folks like me on Harkers o revive the old ways and the old we had restored that boat like we ave when we first got her, I think it ave been a great thing, but I don't would have meant to the people of Island what it does now. Because such a loss in the old traditions, and ke the *Jean Dale* fills them with so ide."

PHOTOGRAPHS BY LAWRENCE S. EARLY

e Earley is the former editor of WINC. *it of his workboat photographs will be l at the N.C. Transportation Museum er from June through December.*

WILD NORTH CAROLINA

Written by Michael P. Schafale · Photographed by David Blevins



A NEW BOOK INTRODUCES READERS TO THE CONCEPT OF NATURAL COMMUNITIES AND BEAUTIFULLY ILLUSTRATES THESE DIVERSE, COMPLEX ASSEMBLAGES ACROSS NORTH CAROLINA.

If you have hiked through North Carolina's parks, driven the Blue Ridge Parkway or another of the state's scenic drives, or paddled its rivers, you have seen natural communities. Perhaps you have wondered about some of the patterns—why you can hike for miles under oak trees and suddenly find yourself amid beeches. Or how you can climb a mountain slope and go from open, fern-filled forest to a hedgelike wall of evergreen bushes. Even if you can't identify the kinds of trees you encounter, you might notice that the trees with the warty bark are always near rivers along with the trees with the blotchy, pale brown, smooth bark. Perhaps you have noticed that the green of the mountains laid out below an overlook is a slightly different shade on the ridges than between them.

These patterns, if you learn to recognize them, can help you better appreciate and make sense of the complexity of the natural landscape. Understanding them helps transform what at first seems like a tangled green wall of vegetation into a meaningful picture of the natural world. Paying attention to natural communities will help you see familiar places in a new way and new places with a sense of familiarity. Look for them, and the details that continue to unfold can feed your curiosity for a lifetime.

The N.C. Natural Heritage Program defines a natural community as "a distinct and recurring assemblage of plants, animals, fungi and bacteria, in association with each other and with their physical environment." Like human communities, natural communities are made up of many different members, all sharing something in common even as each has its own personality. As in human communities, the different members of a natural community are there for their own reasons—the environment of a particular place makes it possible for some species to live there, while preventing

Mayapple, larkspur, large-flowered bellwort and violets are among the herbaceous plants visible in this image of a Mountain Cove Forest natural community. Dutchman's breeches (above) are also found there.

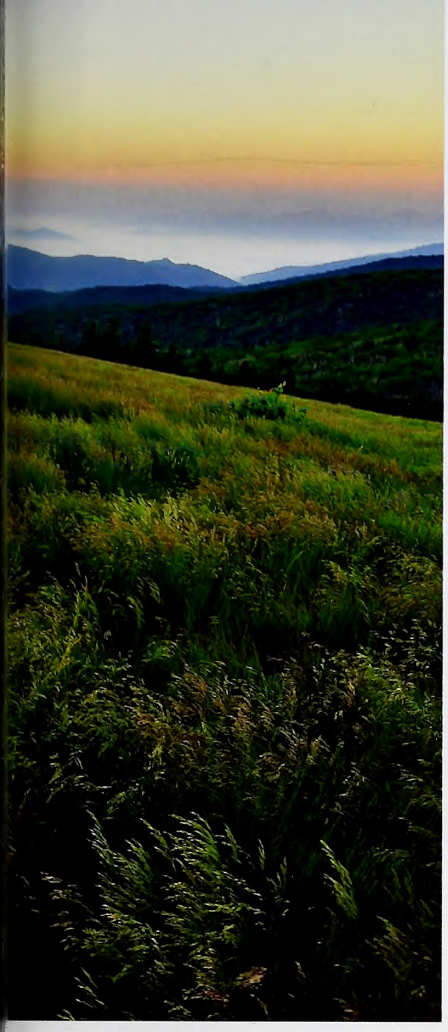
The lovely and rare Gray's lily (above) grows on grassy mountain balds such as Round Bald in the Roan Highlands (right).

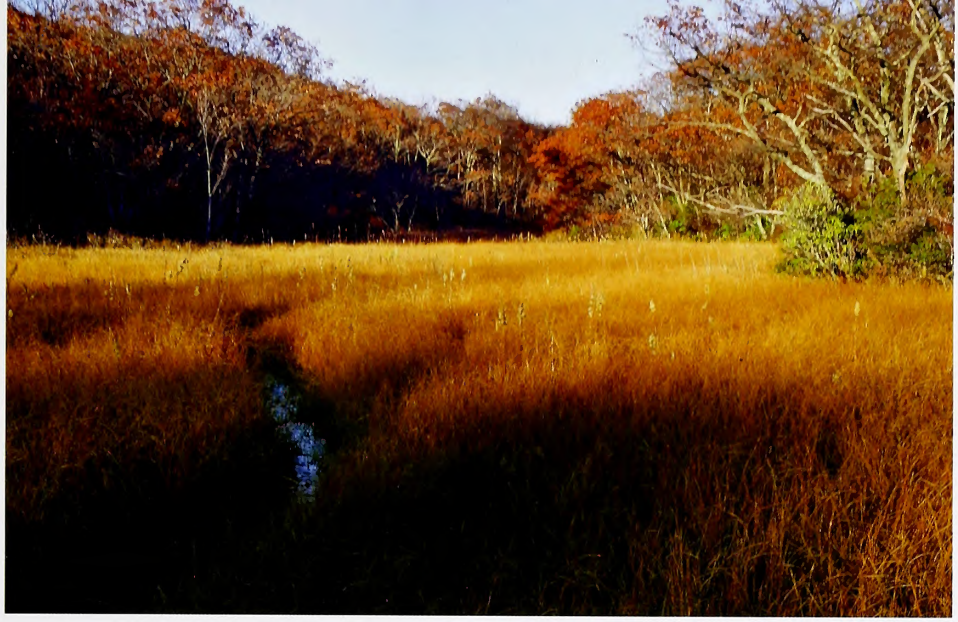
THE N.C. NATURAL HERITAGE PROGRAM DEFINES A NATURAL COMMUNITY AS "A DISTINCT AND RECURRING ASSEMBLAGE OF PLANTS, ANIMALS, FUNGI AND BACTERIA, IN ASSOCIATION WITH EACH OTHER AND WITH THEIR PHYSICAL ENVIRONMENT."

other species from doing the same. Those species of plants, animals, and other organ that thrive in the same kind of environments tend to show up together. But they also int helping each other or competing for space. Interactions make it possible for some speci live together, while driving others out. Though a few members may dominate, setting terms for others' existence, many members make up the community. Communities d from place to place. But go to a similar environment and you are likely to see similar co unities. They won't be exactly the same, but they should share enough that you can recog a pattern—a recurring assemblage.

When you look at natural communities, it generally works best to focus on the veget and on the physical environment. While the animals, fungi and bacteria are crucial mem of the community, the plants make up most of what you see. If you know the vegetation, generally easier to predict the animals than the other way around. Most of the bacteria fungi, even the insects and other small creatures that make up most of the animal compo are too small to see without special equipment. Even the larger animals are good at hi The easily visible animals—deer, squirrels, most of the birds—tend to be those that ra widely through many different kinds of communities, and therefore tell you the least ab the community you are in.

One thing you can do to help make sense of natural communities is to think about w they occur. Many aspects of the physical environment follow broad geographic regions. S are obvious: The mountain region tends to have steep slopes and high elevations, while area near the coast does not. Some are subtle, such as the near-total absence of bedrock the much wider river floodplains in the eastern part of the state. Some are nearly invisi such as the abundant sandy soils in the eastern part of the state and their near absence i western part. Living organisms follow geographic patterns, too, with some species occur only in one region, or at least being largely absent in another. So, often, knowing where yo helps tell you what species or natural community types are even possibilities. Regions s vary in what aspects of the physical environment are most important to look at for determi





The elusive, tiny bog turtle lives in mountain bogs and fens such as the fen at The Nature Conservancy's Bluff Mountain Preserve (above). Below, Eastern prairie wild blue indigo thrives in Piedmont and Mountain Glades and Barrens such as the N.C. Botanical Garden at Penny's Bend.

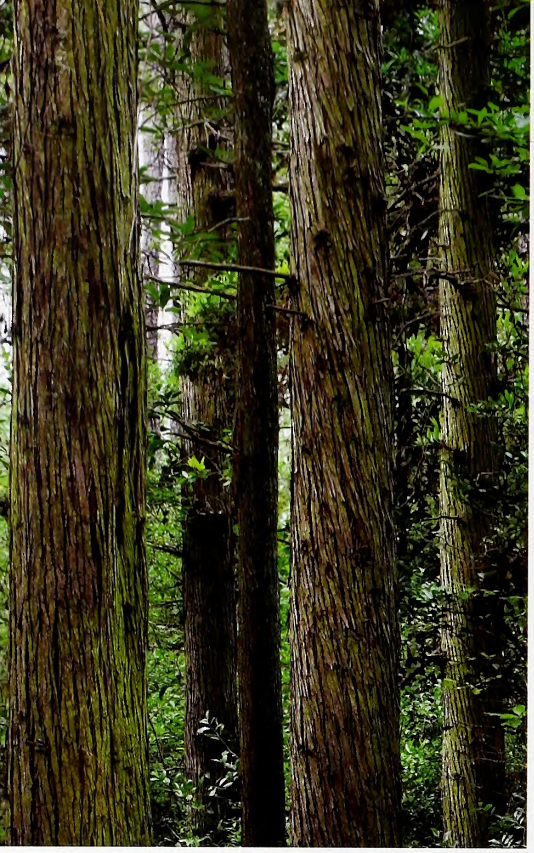
rent natural-community types. Most types of natural communities occur in only one of nree regions of North Carolina. Some others occur mostly in one region but can be found nusual parts of another. Only a few types are common in two or all three regions. The es of the types often indicate where they occur.

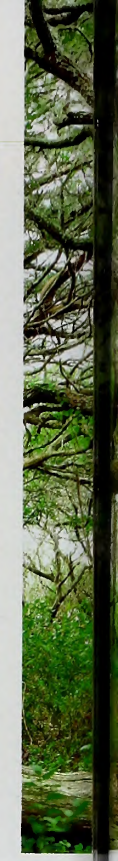
Future of Natural Communities

atural communities in good condition, where the mark of human hands is faint, have dled to a small fraction of North Carolina's landscape. For most of us, natural commu- s are destinations for special excursions rather than the backdrop of our daily lives. Even of our most common kinds of communities cover less than 10 percent of the area they occupied. Some of the less common are down to just a handful of occurrences. Much of oss occurred in the farming and logging, building and draining of generations past. The essional and altered vegetation that dominates our rural landscapes, and even many of arks and conservation areas, reminds us that it can take more than a lifetime for nature cover from such injury.

ne loss of what we have left still continues, and too few pieces of our legacy of nature are rotected. The state's Natural Heritage Program, which inventories remaining natural nunities, must constantly update its database to record the destruction of remaining uples. Mines, landfills, subdivisions, efficiently managed timber plantations, tastefully ned developments, schools and ball fields all consume these rare gems. Whether you the dozens that are lost across the state each year or witness the plight of a particular ite place, a sense of urgency and desperation is not misplaced.

nese remnants of a healthy and vigorous natural world represent not only a pleasant link e past but a crucial resource for the future. Their diversity, and the diversity of species cological processes within them, represents the building blocks for the ecosystems we lepend on in the times to come. We intend these photographs and descriptions to be a d of what is and can be, rather than just an epitaph for what we have lost. In so many





Above: Spider lily in a swamp forest on the Black River. Below: Naturally occurring loblolly pine along the edge of a brackish marsh at Goose Creek Game Land.

of our remaining natural communities, as in the spruce-fir forests, we can see a race betw destruction and hope.

But hope remains a contender in this race. Most of the places we have mentioned as op tunities to see particular natural communities are places where they have been protec Natural communities are protected not only in well-known places such as national and a parks, but also in specially designated areas on national forests, national wildlife refu state game lands, plant conservation preserves, coastal reserves, state forests, county city parks, and a variety of other public lands. There are private preserves as well, from mal preserves of land conservancy organizations to nice spots left alone by individual l owners. There are conservation easements held by conservation organizations, along wit Natural Heritage Program's registry and dedication programs, which allow private landow and public-land managers to make lasting commitments to protecting their natural are

Natural-community protection isn't necessarily simple. Sometimes stopping the l dozers or acquiring land is all that is needed, but usually careful stewardship is crucia

Atlantic white cedar (top left) rises from the Carolina bay at Jones Lake State Park; royal fern and lizard's tail grow underneath water tupelo and bald cypress in a Chowan River tidal swamp (top middle); live oak dominates the maritime forest at Springer's Point Nature Preserve on Ocracoke Island.

re long-term health of natural areas. Natural communities are not artifacts to be put in seum; they are living entities made of organisms that must be born, live out their lives, lie. These reoccurring assemblages of species vary over time, as weather cycles turn and e populations in a given place ebb and flow. Processes such as flood, wind and fire are uch a part of them as the plants and animals.

anaging protected natural areas depends on dedicated scientists and skilled land stewards. s much, it depends on a public that understands the needs and supports the stewards, n volunteers who are willing to help. What can you do to add to the hope for a future e natural communities and nature in general are a part of our lives? You can learn where ost significant remaining examples are and raise your voice for their protection. If you and where natural communities remain, you can learn about them and seek advice experts on managing natural areas for their ecological value. You might wish to pursue servation easement or one of the other options we listed above. You can join land contion and environmental organizations and encourage them to focus on natural commu-. You can urge public agencies and representatives to protect sites, to provide the funding d to acquire them and, often forgotten, to provide the staff and resources for their manent. If you want to put your hands to work, there are many opportunities, from one-time teer projects to consuming passions.

hat you do when you are not in the woods is important, too. The resources you consume, aste you produce, all add to the stress on natural communities both far and near. Perhaps crucially, you can spread your appreciation and concern to those you know. In the end, st hope for the continued existence of our natural communities is a population of North inians who truly want this heritage of nature to be a part of their home. ◆

Blevins is a nature photographer and forest ecologist. His work is inspired by an ciation of the natural patterns found in what at first seems to be a chaotic world. iel P. Schafale has worked as a community ecologist for the N.C. Natural Heritage am for 27 years, focusing on the classification, tracking, conservation and rdship of natural communities.

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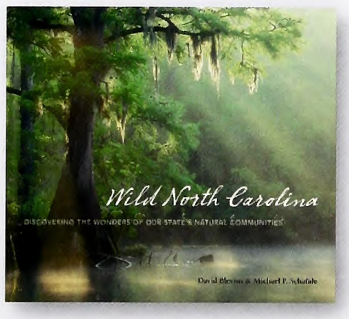

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By David Blevins and Michael P. Schafale
184 pages, 118 color photos
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PART TWO OF A THREE-PART SERIES

LET THEM EAT FISH

North Carolina's fish commission left a legacy of rainbow trout, carp and the possibilities of artificial propagation.

WRITTEN BY JIM WILSON ILLUSTRATED BY TIM LEE

"To be universally popular, fish culture must be based on economic or food considerations, and not on those of sport."

—William P. Seal,
Woods Hole [Mass.] aquarist, 1892

North Carolina's first fish commission operated within the Department of Agriculture, created by the General Assembly in 1877. The agency's goal was simple: provide more fish for the state's citizens. To do so, superintendent Stephen G. Worth began a stocking program that was based in large part on planting exotic species of fish, a practice that was common in the 19th century and remained so into the 20th.

The early federal and state fish commissions wanted not only to stock the valuable native species of fish whose numbers had diminished but also to introduce other species, to find something new and better, something that would survive and increase. Across the United States and in Europe, "acclimatization" societies worked to place exotic species of fish and other animals and plants in new yet accommodating locations, a sort of mixing and matching of suitable species and places, at least some of the time.

Thanks to the 1869 completion of the first transcontinental railroad, in the last quarter of the 19th century brook trout and American shad, eastern United States natives, headed west, and rainbow trout and Chinook salmon, native to the Pacific Rim, came east. Brook trout also were sent to England, France and Colombia, black bass went to England, and brown trout, indigenous to Europe, traveled to the United States. Carp from Europe and Asia eventually flooded the country and today are found in every state except Alaska.

Robert R. Stickney, in "Aquaculture in the United States: A Historical Survey" explains the thinking of the period. "[T]here was no thought given to whether introductions of exotic species might be harmful to native flora and fauna—after all, modern ecological theory had yet to be envisioned," he writes. "The life histories of many species had yet to be worked out, so there was little thought given as to whether a particular species might be able to adapt to the habitat into which it was introduced (the fish culturists did, of course, recognize the temperature tolerance limits of cold-water as opposed to warm-water species)."

Too, the idea was in play that the natural world could be fixed, as Stephen Worth put it regarding fish stocking, "aiding their imperfect efforts." Retired Colorado State University professor, author and noted trout biologist Robert Behnke says that the stocking of Pacific salmon in the West epitomizes that idea. "The large-scale stocking of salmon that began in the late nineteenth century is a classic example of the naïve belief that science and technology can solve all problems and make nature more efficient in serving human society, a belief that seemed to be confirmed by the fact that only 5 to 10 percent of the fish eggs spawned in nature may survive to become emerging fry, while 95 percent survival can be obtained in hatcheries."

And that is the same argument Worth used in touting the possibilities of artificial propagation of fish, the efficiency of the hatchery over nature. Worth's arguments stressed the economic benefits North Carolina could derive from stocking fish. There was little consideration given to any species that was not valuable, either economically or as a food source. Thus Worth, in pressing his case for the common carp, wrote: "They will doubtless become abundant in our streams...where the food supply is quite ample to support them in great numbers. The food that horny-heads [chubs] and other worthless fry subsist upon is equally good for the carp."

It is difficult for most modern fishermen to understand the considerable interest carp aroused in the late 19th century. Considered today an exotic, invasive species at home in eutrophic waters, carp captured the public fancy for a time, due in part to some intensive propaganda efforts from the federal fish commission and in turn the North Carolina commission. "A general interest prevails throughout the State and with careful management of the carp, a great result will follow," Worth wrote.

Native to the Caspian Sea, common carp spread east into Asia and west into Europe and have been a favorite of aquaculturists, ancient and modern. They enchanted the U.S. Commission of Fish for several decades and were promoted as a food fish, particularly for waters other fish might find unsuitable. Early *Fish Bulletins* published by the federal bureau are replete with carp recipes, and testimonials from satisfied carp growers adorn Worth's reports. ("Mr. N. W. Thornton, of Elevation, Johnston County, says: 'With much pleasure I write to inform you that the German Carp you sent me January the 17th, 1881, are the finest fish I ever saw.'")

Carp did enjoy a certain vogue for a number of years, as men went about building ponds on their property, stocking the fish and later drawing down the ponds to harvest them. Eventually, some of the ponds flooded and carp escaped into waterways all across North Carolina, as they did throughout the nation.

"Our efforts have gradually been working toward a practical increase of fish as a food supply, and during the past two years we have found no fish so universally adapted to inland wants as the German carp," Worth wrote in 1883. "In 1880 there were not two dozen fish ponds in the State; to-day there are more than a thousand. All of these ponds have been supplied and there is no doubt we can supply all others for which the fish are asked."

To meet the demand for carp, the [illegible] 1882 built eight breeding ponds in R[illegible] leased another in that city's Oakwoo[illegible] etery, and constructed an additional p[illegible] the grounds of the new hatchery in M[illegible] ton. Obtaining the fish from the ager[illegible] a simple matter. "These fish are giver[illegible] to all who have ponds uninhabited b[illegible] fishes," Worth wrote. "The fish are s[illegible] express anywhere in the State in a g[illegible] bucket. The person receiving them[illegible] requested to pay the express freight[illegible] the cost of the bucket, the sum of th[illegible] items amounting to about 45 cents."

By 1885, about 2,000 carp ponds h[illegible] built in the state, and 92 of the then 9[illegible] ties had received carp. "They will ass[illegible] place on the farm that chickens do a[illegible] fowls, yielding twice the number of p[illegible] afforded by other animals on a like a[illegible] of food," Worth wrote.

s vision, like that for salmon, never alized. It is said that revenge is a dish rved cold, but carp, at least in the is a dish best not served at all. Despite opla, carp never became a popular ource for North Carolinians. As s S. Manooch III and Duane Raver Jr. t their "Fishes of the Southeastern States," "Most Southerners will not p, but they are consumed throughout f the world. The meat may be used e fish cakes, following the recipe r salmon, but one should not expect ne results."

until the early 20th century did the commission slow its carp efforts. ut time it was apparent that the now nt species had limited market appeal s of little interest to anglers," writes re Whaley Cart in a history of the agency from 1871 to 1940. Today, a ut apparently ppy legion of rmen eagerly s carp (see ppy Carp," 008 *WINC*). most anglers, viewed with g degrees of , reflecting a uch like that century out- riter Frank , who said of carp fishing, "This, I I regard as very miserable sport." culturists, too, began to doubt their y of carp. In the 1906 meeting of the n Fisheries Society, John D. Whish, y of the New York Forest, Fish and ommission, told an audience: "I have cieties and heard gentlemen of emi- nfess—I say also, confess very care- hat the introduction of the carp was ltural tragedy."

ecreational anglers, the introduction rnia trout—rainbow trout—pro- e lasting legacy of the short-lived arolina commission. Rainbows, the Pacific Rim from Mexico to n Russia, had been available for from the federal commission only 30, when deputy fish commissioner n Stone set up his first trout hatch- ne McCloud River in California. Halverson, in "An Entirely Synthetic w Rainbow Trout Beguiled America and Overran the World," credits the Ornithological and Piscatorial Acclimatizing Society of California with actually being the first to artificially propagate rainbow trout, perhaps as early as 1872. This society sent 500 rainbow eggs to fish culturist Seth Green in New York in 1875, which Halverson says was the first time the species had been shipped out of its native range.

Worth released McCloud River rainbows in North Carolina, 4,300 of them in March 1880, saying that these trout "are similar in many points to the brook trout. The growth of those released in our waters is very encouraging, and there is no risk attending to a successful introduction into our clear streams," Worth wrote. "They are very choice in quality, of quick movement, taking the fly with eagerness."

Behnke questions the genetic makeup of these fish. In "About Trout," the biologist writes that based upon the descriptions of the trout Stone captured in the McCloud River, those fish were both steelheads, a sea-run form of rainbow trout, and redband trout, a more primitive subspecies of rainbows. "The first spawning at the U.S. trout ponds [on the McCloud] occurred in January 1880," Behnke writes. "Stone mentions that in December, large, silvery trout up to 10 pounds were taken in the McCloud River. Undoubtedly, these were steelhead. The eggs and sperm of both steelhead and resident redband trout were indiscriminately mixed and the fertilized eggs were shipped out to federal and state hatcheries."

"Most Southerners will not eat carp, but they are consumed throughout much of the world. The meat may be used to make fish cakes, following the recipe used for salmon, but one should not expect the same results."

Whatever the genetics, some of the rainbows sent to North Carolina were planted in private ponds, but 1,000 were placed in both Mill Creek in McDowell County and the Johns River, and 500 each in the Swannanoa River in Buncombe County and Upper Creek in Burke County. Worth himself captured both a landlocked salmon and rainbow trout from Mill Creek in 1881, noting, "We desire no better evidence of their adaptability. They were [at 17 months old] larger than any of a dozen representatives of brook (or mountain) trout taken at the same time."

And yet, after this successful introduction, the state would stock rainbows only once

PHOTOGRAPHS BY J.E.B. HALL

The Mt. Mitchell Hatchery, located on Neal's Creek, was once part of the state's hatchery system. Built in the early 1930s by the Civilian Conservation Corps, the hatchery served as a rearing station for trout.

more, in the following year, when Worth noted, "We released in Mill Creek, John's River, Linville and other streams, 40,000 Penobscot and Land-locked salmon, and California Trout." Citing a scarcity of eggs in his report to the legislature as 1882 drew to a close, Worth wrote, "we have paid no attention to them during the year ending at the date of this report." And the commission would pay no more attention to them for the remainder of its existence.

Although the agency stocked relatively few rainbows, it did take the first step in bringing to the Mountains a fish that would play an increasingly larger role in recreational fishing in the next century. In the years after this commission ceased its work, the federal agency continued sending hundreds of thousands of rainbows, along with brook trout, lake trout, steelhead and finally in 1924 brown trout, to be placed in mountain rivers.

By 1893, *American Angler* magazine touted rainbow trout fishing in North Carolina with a story about fishing the Cullasaja River, in particular a 7-mile stretch of the river that had been stocked with rainbows and brook trout by the Highlands Park Association. The rainbows there, wrote Herbert S. E. Anderson, were thought to reach 6 or 7 pounds. "Besides their attractive appearance and delicious flavor, the California trout are very game and powerful, and make a grand fight for liberty," Anderson wrote. "A half-pound California will take as long to land as a brook trout double the weight."

It was in the Coastal Plain where the state commission directed the majority of its work, building two hatcheries for American shad in the Albemarle Sound area and stocking more than 25 million fry during the agency's history. Ironically, it would be shad that proved the commission's undoing.

Working with the owners of area fisheries, fish commission workers took the eggs fertilized on the shore to the hatcheries to grow for a few days and then released them into waters up and down the coastline, from the Chowan to the Cape Fear and as far inland as the Yadkin and Catawba. North Carolina's efforts were supplemented and subsidized by the federal fish commission, which often sent the hatchery ships *Lookout* and *Fish-Hawk* to the Albemarle Sound. The *Fish-Hawk* continued working the sound until the national government established a permanent hatchery at Edenton in 1900. It was not uncommon for the United States commission to supply a great number of eggs, for the North Carolina crew was largely inexperienced. As Worth wrote in 1881, "The fact that we had few men of any experience and none fully versed in the work, lent further embarrassment to the situation. ... Of the force engaged but four had ever seen a young shad, and they were novices."

The *Lookout* helped with the work in 1879 but was unavailable in the spring of 1880, and Worth was caught short, "without any appliances for collecting or hatching the eggs. It remained for us to fit up for this work, or allow that season to pass and accomplish nothing." Worth chose to fit up, but only after lengthy discussions by his governing board, which decided to undertake the work. He constructed at Dr. W. R. Capehart's Avoca Plantation a "plain building," a single-story structure measuring 20 feet by 30 feet, to house the equipment and men who would attempt to hatch shad eggs. "An engine, two steam pumps, and [hatching] cones occupied the main floor, the space between being occupied by the dining table. In the attic hammocks were swung for twenty men. ... The engine was steamed up on April 14th, and worked twenty-seven days and nights without an hour's interruption."

"The fact that we had few men of any experience and none fully versed in the work, lent further embarrassment to the situation. ... Of the force engaged but four had ever seen a young shad, and they were novices."

Worth's force collected more than 10.5 million shad eggs and hatched more than 5.5 million, a total greater than that the experienced federal men had accomplished in each of the two previous seasons, when they had performed most of the work. According to Worth's calculations, the cost per thousand of released shad amounted to 26 cents. All told, the state agency spent $3,500 that year, including $2,500 for new hatcheries.

"We are fairly in harness," Worth wrote of his men. "Whatever is lacking is due to an absence of more adequate means. ... We have planted, however, 12 ½ million fish, and with their return we look for greater liberality in funds. ... While some S are spending $30,000 a year I do no that our modest efforts are by any m contemptible. With more money we do more; but with the same amount are none who do more."

Through 1884, the commission v stock another 12 million shad fry, alt it is difficult today to say what effect, the work had on shad populations. C mercial landings of shad in North Ca peaked in 1897—13 years after the c sion ceased stocking fish—at 8.8 m pounds. By 1918, the harvest had fal 1.5 million pounds. After a rise to 3. lion pounds in 1928, shad harvests trended downward to the point that the fish is more important to recreat anglers than to commercial fisherme federal commission would stock hun of millions of shad in North Carolin the state agency stopped its work but not alter the steady decline of the sp

The issue of accountability—prec what the commission *had* accomplis would doom the agency a few years Worth had recognized problem in 1881. "As i we have no system of s tics, and a very conside increase may disappear an increased number o and consumers, withou ing special comment," h of American shad. "If, h we maintain the work on a basis of t last spring, whereby our main strean get a million fish annually, there will need felt for statistics."

That need, however, did exist, a Worth must have felt it. He included reports to the General Assembly ane evidence from shad fishermen of ca increases: a jump from 8,000 shad ir at the Calm Point Fishery 6 miles a Plymouth to 10,000 in 1881, and a ri 17,225 near Edenton in 1879 to 21, 1882 for J. G. Wood. From the lette received, Worth figured that "we hav an increase in the rivers with the exc of the Cape Fear." Worth thought t ricading of the New Inlet might have some role in the failure of shad to in in the Cape Fear but attributed mos blame to "increased fishing, and the ingly muddy bottom of that river, wh eggs are dropped."

This old wooden fish trap from Catawba County would have been similar to those in use in the late 19th century when fish commission superintendent Stephen G. Worth reported that landlocked salmon and rainbow trout had been trapped in the Johns River.

PHOTOGRAPHS BY MELISSA McGAW/NCWRC

American shad natural history worked against an agency that existed only eight years. Shad spawn in fresh water and return to the ocean for three to five years before finding their natal streams again to spawn. Thus shad stocked in 1881 would not return to the rivers until some time between 1884 and 1886. By the latter date, the commission was effectively gone, as the state's interest had turned from marine fish and freshwater fish to the next big thing, shellfish, and North Carolina had established a shellfish commission.

The end came in 1885, when the Agriculture Department complained to legislators of the money spent annually, about one-quarter of the department's income, on the "hatching of sea fish." The fish commission spent $10,041 in 1884. "From these large expenditures, continued through so many years, the Board is constrained to say, that there have been no satisfactory results. It is submitted that the propagation of sea fish has been sufficiently tested here, and upon every consideration of prudence, the expenditures for that purpose ought to cease." However, this proposal did not affect the only fish the agency was still stocking. "Carp culture has been carried on with success, and the work in this direction can be expanded to any needful extent with small expense."

In addition, the agriculture board recommended changing a law: "The Board would also recommend the repeal of that part of the said clause relating to 'constructing fishways over dams and other obstructions in the waters of the State.'" To comply with the law, the board said, either the state would have to construct the passages, which would consume the department's income and take many years, or require the dam owners to do so, which the board believed "would be in conflict with one of the fundamental principles of our government, namely, that private property shall not be taken for public use without just compensation."

That is actually what had concerned agriculture commissioner L.L. Polk at the beginning of the fish commission, yet he had reached the conclusion that the public good was best served by requiring the free passage of fish. Polk, however, had left the Department of Agriculture early in the history of the agency, and no real progress ever was made in finding a solution to the dams.

The tangible evidence of the state's first commission is slight—a great many carp that most anglers don't fish for is perhaps the lone physical trace of that agency's work. And carp are a checkered legacy indeed. Sometimes called the perfect invasive fish because of their ability to live in water other fish cannot tolerate and their prolific spawning, carp also degrade aquatic habitat and consume great amounts of plant material. Thus they bring harm to not only aquatic animals but also other creatures, such as waterfowl, that use the same habitat. In attempting to stock a food fish, the commission unknowingly created a problem that remains with us today.

The true legacy of the commission is intangible, more of mind than of matter, for this agency showed the possibilities of the artificial propagation of fish in North Carolina, that stocking fish could b our state and its citizens. It is an ide would find fertile ground with anoth agency in the next century and reac heights with the work of the N.C. W Resources Commission, for whom th ing of fish remains a crucial element fisheries management. ◆

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Part Three: June 2011

The rise of modern, consistent hatch operations throughout the state

AN ARDUOUS QUEST FOR BROOK TROUT

In the summer of 1878, Stephen Worth set off to procure brook trout brood stock for North Carolina's fledgling hatchery operations. The work was arduous and conditions difficult in the Mountains as his party sought suitable specimens of the native brook trout, the only trout in North Carolina waters at the time (although in truth the brookie is a char and not a trout). The following paragraphs are excerpts from Worth's report of the expedition.

"After earnest entreaty on my part, it was agreed last June that I should be allowed to collect as cheaply as possible some of our fine brook trout—yet abundant in our most retired western streams for spawn taking purposes. Accordingly I spent several weeks in some of the wildest mountain gorges of the State. In the more settled portions they have become scarce and some of the finest procured were carried from the headwaters of the Tow [sic] River at the base of Mitchell's peak directly up the side of the Blue Ridge within three hundred yards of the Pinnacle.

"I was accompanied by a small party and we relieved each other by turns. These fish we carried on our shoulders four miles up the Ridge and three miles down, accomplishing a trip in ten hours and thirty minutes. On an average the water was renewed every seven minutes and when it is remembered that we had to wade the streams and follow a course that only men reared in those mountains could follow, it may well be realized that in conjunction with the highest summer heat ever known there, that the undertaking was of a severe nature.

"Owing to the streams being 'fished out' at so late a season as July 3rd and the fish being scarce, and the high summer heat and slow transit over the rocky and in many places nearly impassable roads, I could not get any vast number, of those I did get, many were lost through the last mentioned agencies. I secured over 2,000 fish, but from deaths from various causes, including injuries in the brain from the hook, they only numbered 1,400 in September."

Worth took eggs from these brook trout on Oct. 29, 1878. He obtained about 10,000, but then "the fish became so wild that they would no longer enter the spawning races, and I was obliged to stop. It was not advisable to net them owing to the fact that the Salmon from California were hatched in the house below, and I deemed it unsafe to stir up the bottom and send down an epidemic-producing volume of impure gases which had formed from waste meats in feeding the trout previously."

Writing in the spring of 1879, Worth reported that the eggs he did collect successfully hatched, along with 40,000 of the 50,000 brook trout eggs purchased from New Hampshire. Although Worth does not say so, it is a reasonable assumption that the commission's first and only stocking of brook trout, in March 1879, comprised both native fish and those from New Hampshire, thus marking the first time a non-native strain of brook trout appeared in North Carolina streams.

As unseasonably hot as the summer had been, Worth and his men encountered more miserable weather in winter at the temporary hatchery at Swannanoa Gap, situated at an elevation of about 2,600 feet near the Eastern Continental Divide. "Our hatching house building is of the most inferior quality, but was constructed for experimental work and has answered all purposes so; but as nothing but running *branch* water is used, its temperature is so reduced in cold weather as to freeze solid in troughs, house and ponds without incessant labor night and day while the cold spells prevail. The troughs, reservoir and supply troughs are common and leaky and the ice formed eighteen inches thick on our entire floor, even encroaching on our office, freezing six inches thick and remaining a *month* in the bunks made for our sleeping accommodation, and within four feet of a stove in which a fire burned night and day for weeks. I respectfully recommend that we may have a new building."

And indeed the commission did construct a new and much better building, but not at Swannanoa Gap. The state instead built a hatchery in Morganton, on the grounds of the state asylum there, in the summer of 1879.

"Since fish culture is destined to become an important factor in the political economy of our people, the educational facilities offered by the State hatcheries are of great benefit," he wrote. "The publicity of this location attracts a large number who otherwise could not visit it. Of about three thousand who have seen the hatching in operation, only about three have expressed a disbelief in the success of the work."

–Jim Wilson

The WHITE SQUIRRELS

Around 1998, Tarence Hunsucker noticed something strange at his backyard bird feeder: a completely white squirrel. Thrilled by his discovery, he told his wife, Betty, who quickly informed him that he must be mistaken. Surely it was a white cat he had observed. After all, a white squirrel is just not something you see every day.

The next day, when the squirrel made another appearance at the feeder, Hunsucker pointed to it and asked his wife, "OK, what is that?" His wife couldn't believe her eyes as a brilliant white squirrel stared back at her from their back yard.

Twelve years later, Hunsucker's eyes twinkle in the afternoon light as he recites the story of the white squirrel and his late wife. I had traveled just down the road from my hometown of Aberdeen to Rockingham in Richmond County to follow up on rumors of a resident population of white squirrels thriving within the city limits. The squirrels in question are Eastern gray squirrels, *Sciurus carolinensis*, animals likely familiar to most North Carolinians.

Populations of white gray squirrels are well known in the eastern United States. A quick check on the Internet will find no fewer than 10 towns claiming to be "the home of the white squirrel." Brevard, a mountain town in Transylvania County, has a large population of the pigment-challenged rodents. Each spring, the town hosts a white squirrel festival, attracting visitors from across the nation in celebration of the pale creatures.

However, except among local residents, the white squirrels in Rockingham remain virtually unknown. By interviewing residents

s small Sandhills town, I hoped to learn about the white squirrels: how many were, how far they ranged and how they survived for so long. And of course, I wanted to see one for myself and take a hotos.

it turned out, finding the squirrels was rd. As I stood and talked to Hunsucker, of white squirrels frolicked next door granddaughter 's front yard. As the els chased each other around a large oak tree, I noticed that their eyes were and not pink, as one would expect for lbino animals. The squirrels appeared leucistic. The term *leucistic* is derived he Greek word *leukos*, meaning white. lbino animals, leucistic animals lack pigment in their skin but retain pigment in certain areas of their bodies such as the eyes. Leucism is a recessive trait that can be passed from generation to generation, providing both parents carry the gene for the condition. For whatever reason, this gene appears prevalent in the population of gray squirrels around Rockingham.

Hunsucker mentioned that over the years he has seen as many as five white squirrels in his yard at one time. That such numbers of white squirrels could exist in Rockingham seems amazing. Most albino and leucistic animals do not survive long in the wild, particularly if they are small, tasty mammals such as squirrels. Their striking white coat is like a beacon in the night to predators.

According to local residents, the area of Rockingham where the white squirrels occur is small in size — approximately 3 square miles. Within this area are small homes, manicured lawns, tall trees and plenty of bird feeders. The habitat is perfect for the white squirrels. Few, if any, of the typical squirrel predators, such as bobcats, foxes, coyotes and owls, occur in the area. Tall trees provide adequate coverage and safety for the squirrels to build their bulky nests of twigs and leaves.

Trees also provide refuge from their most dangerous predator in the urban environment, the domestic cat. Several people I spoke to reported cats killing juvenile white squirrels on occasion. Aside from area cats,

# of Rockingham

written and photographed by Todd Pusser

Brevard is the best-known place in North Carolina to see white squirrels, but this Richmond County town has its own disjunct population of the pallid mammals.

A day in the life of a white squirrel: gathering nest material (preceding pages), eating, grooming and taking naps. The white squirrels of Rockingham are completely white, unlike the squirrels from Brevard which have varying amounts of gray on their heads and backs (opposite page, bottom).

the biggest threat to the white squirrels is the automobile. Each year busy roads claim the lives of many white squirrels. At least three white squirrels have been struck and killed on Hunsucker's residential street over the last few years.

To get a better sense of how many white squirrels were in Rockingham, I invited my father along for an informal survey of the neighborhood. Over the course of an afternoon, we drove slowly down each street within a 3-square-mile area of Hunsucker's house, scanning each yard and counting every gray squirrel we observed. I am sure more than one person was suspicious of our activity. After all, it is not every day you see a couple of grown men stopping in yards, excitedly pointing and leaning out of the car window with high-powered binoculars draped around their necks, shouting "There's one over there!" I am surprised the Rockingham police did not pay us a visit on our little squirrel survey.

Whenever a white squirrel was encountered, we noted the location and time. If the squirrel was observed in someone's yard, we made an effort to knock on their door and ask if they knew about the squirrels and what their experiences were with them. Many area residents hung bird feeders in their yards to attract the local avifaun squirrels love birdseed, especially sur seeds, and are attracted to it like sharl blood in the water. Their destruction feeders has long been the bane of m backyard birder. Things are differen Rockingham, however. Every perso spoke to welcomed the white squirr their feeders, and most even put out a extra seed for their furry friends. The anyone could recall encountering a w squirrel in their yard was around 198

After a couple of hours of driving t the neighborhood, Dad and I had enc tered 48 gray squirrels, 8 of which wer

ıbt we missed seeing many animals, r informal survey suggested that at in 6 squirrels in this part of Rocking- as white, certainly a high percentage ɔopulation.

white squirrels have been present in rt of Rockingham for at least 25 years. quirrels can live as long as 12 years ivity, but the average life span of an n the wild is six years. So, it seems veral generations of white squirrels ılled Rockingham home for at least cades. No one is really sure how the quirrels got to this small Richmond y town, but a few rumors surfaced my informal interviews. One hinted amily from Illinois brought a pair of quirrels with them when they moved ingham in the 1980s. Upon arrival to Carolina, they released the squirrels r back yard. The white squirrels ed in Rockingham today are believed e to be descendants of that original m Illinois. How much of this story may never be known, but there is a ı Illinois—Olney—that is famous ɔopulation of white gray squirrels. r, the squirrels in that population are inos, with pink eyes. The Rockingham ls, as shown in the photos of this arti- e dark eyes.

origin of the white squirrels in gham may never be truly known. It ble, even likely, that the gene for a oat just happened to occur in the ion of the local gray squirrels all Over time the gene was expressed e to continue for many generations he local environmental conditions, of natural predators and a readily e food supply.

yone we spoke to loves the white s and is fiercely protective of them. surprising. Their striking white coats , in the late afternoon sunlight are ngs of beauty. Many cultures through- world have been fascinated by albino . Some, such as the Cherokee in North Carolina, believe albino to be sacred.

wn fascination with unusual white stems from my childhood. I vividly e time a close friend of the family, rdan, killed an albino raccoon near our house in Eagle Springs on a cold winter's night under a full moon, after his hounds treed the animal in a longleaf pine. As a teenager, I saw a white red-tailed hawk soaring on a hot-air thermal over a large soybean field. Another time, I observed a completely white fox squirrel, a larger cousin of the gray squirrel, slipping through the pines in a longleaf forest near my home. I spent over three months trying to relocate and photograph that squirrel, to no avail. Like some ghostly apparition it simply disappeared, never to be seen again.

Now that I know that a population of white squirrels lives so close to my hometown, I intend to spend many hours watching and photographing the antics of these rare animals. I will be closely observing the pair of white squirrels in Hunsucker's yard this spring. My hope is that they will raise a new generation of white squirrels for others to enjoy. If you find yourself driving down U.S. 1 in northern Rockingham anytime soon, keep your eyes peeled for the small white squirrels. Maybe you will be lucky enough to spot one of North Carolina's most beautiful and unusual mammals.

Todd Pusser is a regular contributor to WINC. To see more of his photography please visit www.toddpusser.com.

Tarence Hunsucker has been observing white squirrels from his living room window for almost 15 years.

Celebrate the WHITE SQUIRREL!

Brevard hosts its seventh annual White Squirrel Festival on May 29–30.

The music and street event features two days of free concerts on Main Street, along with eight blocks of food vendors, merchants, artists, craftsmen, potters, painters, games and kids' activities. Don't miss the Squirrel Box Derby, where kids from 8 to 80 come from all over the region to race handmade derby carts down Jailhouse Hill. For those inclined to run rather than ride, enter the 5K and 10K White Squirrel races.

White Squirrel Tours enable wildlife watchers and photographers to see the distinctive creatures for which the festival is named. Shutterbugs with a great image of the namesake mammals can enter the White Squirrel Photo Contest.

For complete details, including music and event schedules, visit www.whitesquirrelfestival.com.

Bup . . . bup . . . bup-bup-bup-rrrrrh!
That distant drumming in the wood is how one kind of bird announces th end of winter. But a ruffed grouse doesn't just celebrate spring. It's

A Bird for All Season

written by Julie Dunlap
illustrated by Consie Powell
nature activity by Anne M. Runyon

When the snow melts in North Carolina's mountains, ruffed grouse males perch on logs like kings on thrones.

KING OF SPRING

Each cock proclaims his realm by fanning his tail, flaring his crest and fluffing the dark ruff that gave him his first name. Then he cups his wings and beats them against the air, slowly, then faster and faster. Through much of the day and into the night, the wing beats sound like a muffled motor starting up in the forest. Like a proud ruler, the drummer warns rival males away while inviting females to his court from near and far.

Spectacular courtship displays aren't unusual among the ruffed grouse's fancy-feathered kin. Grouse belong to the Phasianidae family, a nearly worldwide group of about 200 species ranging from plump little ptarmigans to magnificent wild turkeys. Free-ranging relatives of barnyard chickens, grouse and their kin are well-built for walking. Strong legs support heavy bodies, and powerful toes scratch the ground for food. Each ruffed grouse male struts his stuff alone, some in North Carolina's mountain forests, and others north and west as far as Alaska.

Ruffed grouse can fly and may feed and perch in shrubs and trees. But they spend most of their time walking and feeding at ground leve

UMMER SUPERSTARS

.s the weather warms, males till defend their logs, but :males are silent and lmost invisible. Mottled :athers help each hen lend into the shrubby ndergrowth, where her 'arm body protects a nest she :raped in the ground and lined ith dried grass and pine needles. /hile incubating 9 to 14 buff-colored eggs, she atches out for skunks, foxes and other predators oking for a raw egg breakfast—all without any help om her mate.

After about 24 days, the chicks peck out of their ells, all hatching the same day. Their wet down soon ies into dense fluff, and within several hours they're ready to walk. A few *cluck-cluck-clucks* from their mother, and the chicks follow her into the woods for lunch. Her diet has shifted from spring fare, such as new leaves and birch catkins, to seeds, berries and other summer favorites. Chicks scratch the leaf litter and peck up their own choices, usually ants, grasshoppers and other protein-rich insects in their fast-growing first weeks. Flight feathers sprout so quickly, they can fly within two weeks, but chicks that flap off alone may be snatched by a great horned owl. To stay safe, young grouse stick close to Mom through the summer.

FALL PHENOMENON

By fall, the next grouse generation is ready to go off on its own. But they don't go far. Ruffed grouse : Tar Heels all year long. Males are especially loyal the area near where they hatched. Once one finds a od drumming log, he spends the rest of his life fending it.

Using the same territory month after month means it a ruffed grouse must find food and shelter in one all space, often young forests with a mix of ever- :ens and broad-leaved trees. Even as the air cools d leaves fall, birds can take cover in pine trees and st on acorns, wild grapes, beechnuts and other umn forest treats.

WINTER WONDERBIRD

Of all the seasons, winter may suit ruffed grouse best. Many other creatures flee south or curl up in hibernation to escape freezing weather and shrinking food supplies. But a grouse sprouts extra leg feathers to keep warm, and nibbles on twigs and buds that taste bitter to other wildlife. It gulps food quickly during the warmer parts of the day, storing it in a sac-like organ called the crop. Later, another organ called the gizzard grinds the tough diet into more digestible bits while the bird rests in a warm thicket.

In fact, a ruffed grouse's favorite weather is snow. Adults grow their own snowshoes—bristle-like combs on their toes that spread their weight out on the soft surface. If 10 frozen inches cover the ground, grouse tuck their wings and plunge into the whiteness. Resting in a snug snow bank saves energy and hides birds from coyotes and other winter hunters. Thanks to such winter-wonderful traits, ruffed grouse can survive blizzards that wipe out turkeys and other hardy relatives.

Like a fluffy blanket, insulating snow keeps a buried grouse 30 degrees warmer than birds in the bushes above. During storms, they live off fat reserves from their autumn feasts.

FOREST FORECASTER

Populations of these incredible survivors often rise and fall in regular cycles. After each 10-year peak, ruffed grouse numbers drop, probably responding to a cycle of increasing predation. With their large broods of chicks, grouse populations can recover quickly.

In some parts of the United States, more grouse probably live now than before European settlers arrived. But if young grouse cannot find woodland homes, their future is dark. While some species require mature forests, grouse like younger woods—perhaps disturbed by fires—with a mix of trees and shrubby undergrowth. Preventing natural disturbances or turning woodlands into stumps means fewer birds. Protecting drummers in our woods will protect North Carolina's mountain forests season after season.

Ruffed grouse come in two basic color types: gray and red. Birds in warmer climates, like North Carolina's Appalachian mountains, are usually rufous-colored.

Males are usually a bit bigger than females and usually have unbroken tail bands. But differences are often small, so it can be hard to tell males and females apart.

Get Outside

Get grousing! No, that doesn't mean to start complaining. Instead, head for the Appalachian woods and find places ruffed grouse might like to call home. In any season, look for a mix of young trees and undergrowth that would offer the birds lots of food and cover. In spring, keep your ears open for drumming and your eyes peeled for fallen logs that might make good drumming stages. Curved, pencil-thin droppings around a log are clues a male has strutted there. Droppings, broken buds and tracks on snow can reveal a winter roost. Chances are you won't spot this secretive bird even if one is close enough to watch you. But you'll learn about their habitat and enjoy a day outside. That's nothing to grouse about!

Read and Find Out

- "Snowbird" by Cynthia Berger, *National Wildlife*, December/January, 2003/2004.
- "The Lives of North American Birds" by Kenn Kaufman, Houghton Mifflin, 1996.
- "The Sibley Guide to Birds" by David Allen Sibley, Alfred Knopf, 2
- "The Sibley Guide to Bird Life and Behavior" by David Allen Sible Alfred Knopf, 2001.

In *Wildlife in North Carolina:*

- "The Grouse Whisperer" by Jim Wilson, December 2007.
- "North Carolina's Ruffest Game Bird" by David Hart, February 19
- "Ruffly Speaking" by Vic Venters, January 1994.

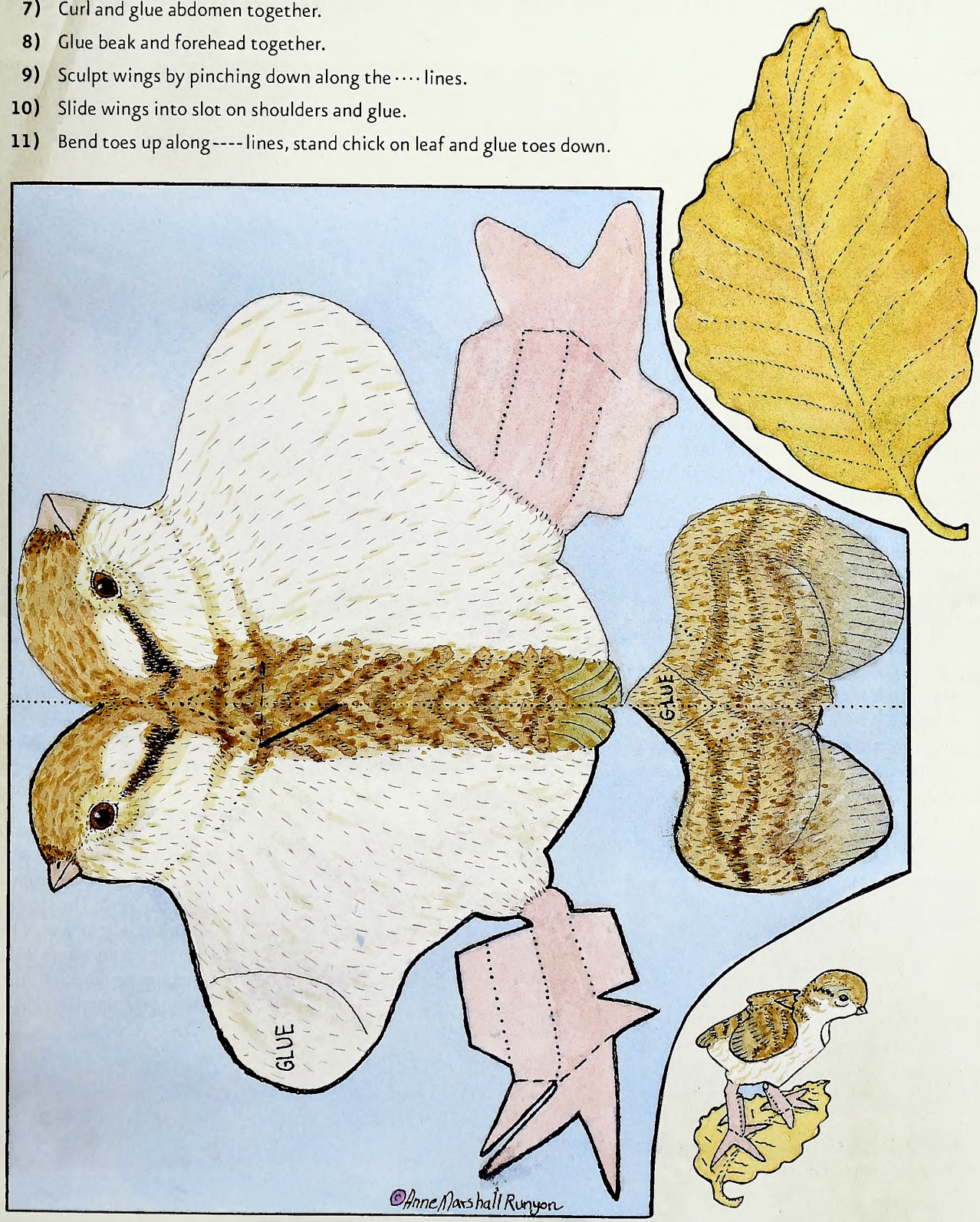
On the World Wide Web:

- Ruffed Grouse Society www.ruffedgrousesociety.org.
- Cornell Laboratory of Ornithology, Ruffed Grouse www.allaboutbirds.org/guide/Ruffed_Grouse/lifehistory.

Find out more about Project WILD Workshops and literature at the Wildlife Commission's website at www.ncwildlife.org.

Make a Ruffed Grouse Chick Paper Sculpture

1) Copy chick design on heavy paper. Cardstock works well.
2) Cut out leaf and set aside.
3) Cut out blue shape and carefully fold in half along the ···· line.
4) Cut out both wings and chick along the bold black lines.
5) Cut the wing slot, and then unfold your chick and her wings.
6) Fold leg flaps down along the ···· lines and glue together. (Your chick will have little triangular "boots.")
7) Curl and glue abdomen together.
8) Glue beak and forehead together.
9) Sculpt wings by pinching down along the ···· lines.
10) Slide wings into slot on shoulders and glue.
11) Bend toes up along ---- lines, stand chick on leaf and glue toes down.



Delaware Artist Wins N.C. Duck Stamp Competition

Delaware artist Richard Clifton's painting of a pair of Canada geese standing in a pasture was selected as the 2011 North Carolina Waterfowl Conservation Stamp and Print.

The painting, "Canadas in Pasture," was unveiled at the 16th Annual East Carolina Wildlife Arts Festival and the N.C. Decoy Carving Championships in Washington during an evening preview reception in February.

Representing the N.C. Wildlife Resources Commission at the unveiling were Chief Deputy Director Mallory Martin; wildlife commissioners Wes Seegars, Ray White and Mitch St. Clair; former wildlife commissioner Arthur Williams and Sen. Stan White, who succeeded Marc Basnight in the N.C. General Assembly earlier this year.

The unveiling of "Canadas in Pasture" marks the first time Clifton has won North Carolina's waterfowl conservation stamp and print competition. He placed second in last year's contest with his portrait of snow geese.

Clifton, an avid hunter, is a self-taught wildlife artist who uses his experiences in the field as inspiration for his work. His waterfowl paintings have won more than 30 duck stamp competitions, including the 1996 Australian duck stamp and the 2007–2008 federal duck stamp, the oldest and most prestigious wildlife art competition in the United States.

NCWRC

Richard Clifton (center) accepted his prize for winning the competition in Washington.

Clifton was one of more than 30 wildlife artists from 19 states and Mexico to submit entries for the fourth annual competition. In 2008, the Wildlife Commission began partnering with the East Carolina Wildfowl Guild to conduct a nationwide competition open to the public.

This year, artists could submit portraits of redheads, brant, Canada geese, tundra swans or gadwalls. In addition to Clifton's painting, four others, rounding out the top five entries as selected by a panel of judges on Jan. 31, were unveiled during the reception.

2ND PLACE – Tim Donovan of Lovettsville, Va.; CANADA GEESE

3RD PLACE – Scot Storm of Freeport, Mi
REDHEADS

4TH PLACE – Jennifer Miller of Olean, N.
GADWALLS

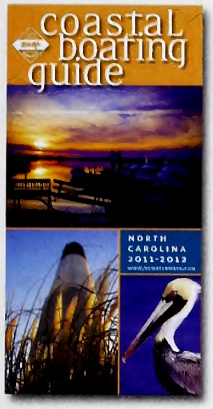
5TH PLACE – George Lockwood of Santa Ynez, Calif.; GADWALLS

Signed and numbered regular edi prints with mint stamps of the winnir trait will be available from the commiss July 1 for $145. The stamp is $10.

Proceeds from sales of the print and s go to the commission's Waterfowl Fund. generates revenue for the conservatio waterfowl habitat in North Carolina.

e NEWSLETTER
Get N.C. Wildlife Update—news including season dates, bag limits, legislative updates and more—delivered to your Inbox from the N.C. Wildlife Resources Commission. Sign up at www.ncwildlife.org/enews.

ating Guide Available



e 2011–12 N.C. Coastal Boating is now available he N.C. Wildlife rces Commission. e newly designed, tide features a map state's coastline, with information boating safety, ms and parks, g access areas, ion, licenses and piers. It also offers a guide to the Town Island, along with facts on the Intra- Waterway and other coastal resources. more information on boating in North na or to order a copy of the guide, visit ncwildlife.org. Guides also can be d by calling the Division of Engineering es at (919) 707-0150.

Boat Ramp Reopened in Ocean Isle

N.C. Wildlife Resources Commission s completed renovations on the Ocean ach Boating Access Area, which ed to the public in early March. commission has expanded and paved king lot and also added additional ater treatment facilities.

r coastal region continues to be a pop- stination for boaters across North na," said Erik Christofferson, chief of nmission's Division of Engineering s. "These renovations will make Ocean Isle a more convenient spot for boaters, and we are pleased to provide this improved access to our state's waters."

For more information on in North Carolina, including an inter- nap of free, 24-hour boating access isit www.ncwildlife.org/Boating_ ays/Boating_Maps_Locations.htm.

Controlled Burning Aids Firefighters at Holly Shelter

Routine controlled burning on Holly Shelter Game Land mitigated the damage caused by a recent Pender County wildfire and allowed firefighters to suppress it quicker, foresters with the N.C. Wildlife Resources Commission say.

Regular controlled burning reduces the fuel load — or buildup of grass, leaves, pine straw and other forest debris — allowing firefighters to suppress a wildfire faster than they would have otherwise.

"When a wildfire does come through, there is a lot less there to burn than there would have been if we had not been doing controlled burning," said Ken Shughart, a forester with the commission. "The N.C. Forest Service did have to evacuate some houses, but it would have been much worse had we not been doing the burns. This fire had the potential to burn all the way up to N.C. 17."

The Wolf Island wildfire burned 678 acres on Holly Shelter Game Land on Feb. 19 in Pender County, just northwest of Hampstead. Commission foresters, biologists and technicians perform controlled burns at Holly Shelter every year, rotating so that forested stands are burned every three years. The wildfire would have burned more, Shughart said, had the commission not kept up the routine of controlled burning — a routine that is common on many of the more than 2 million acres of game lands across North Carolina.

In addition to reducing fuel load, controlled burns maintain habitat for protected animal and plant species such as the red-cockaded woodpecker, the gopher frog, the Venus flytrap and the rough-leaf loosestrife.

Fire once occurred naturally across North Carolina. Low-intensity fires burned every few years, fueled by grass, leaves, pine straw and other forest debris. They kept the forest open, allowing sunlight to penetrate to its floor and reducing buildup of dangerous fuel loads. Fire suppression altered the landscape, allowing fuels to accumulate and putting people and communities in jeopardy.

There are many fire-dependent ecosystems across the state from the Mountains to the coast, including most oak and pine forests. Without fire, many native plants and animals would disappear due to lack of food, habitat and conditions needed for them to exist.

Controlled burning participants receive extensive training to ensure that they are careful to protect surrounding communities, themselves and the land they are working to restore. Fire experts do a great deal of work before the burn. They create a burn plan, which includes smoke management details, fire control measures, acceptable weather parameters, equipment and personnel needs. The plan also details how the ecosystem will benefit from fire.

For additional information on controlled burns, visit North Carolina Cooperative Extension at www.ces.ncsu.edu/forestry/pdf/ag/ag630.pdf. For more information on the Wildlife Commission, visit www.ncwildlife.org.

NCWRC

CALENDAR OF EVENTS

Saturday–Sunday, April 30–May 1

Buy, sell or trade at the Dixie Gun & Knife Classic in the Jim Graham Building on the N.C. State Fairgrounds in Raleigh.
Visit www.dixiegunandknifeshow.com.

Saturday May 7

Learn about wooden boats at the N.C. Maritime Museum's Wooden Boat Show in Beaufort. Demonstrations and exhibits will reveal the art, craftsmanship and history of wooden boats. Call (252) 728-7317 for more information.

Celebrate trout at the Great Smoky Mountain Trout and Heritage Festival in Maggie Valley. Activities include an educational/nature expo, fly-fishing demonstrations and aquarium.
Visit www.gsmtroutfestival.org.

Friday–Sunday, May 27–May 29

Explore the paleontology of the Coastal Plain at the annual Aurora Fossil Festival in Aurora.
Visit www.aurorafossilmuseum.com.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

IN SEASON

This month, these seasons are open in North Carolina:

Hatchery Supported Trout Waters:
Through Feb. 28, 2012.
Wild Turkey (Male or Bearded Only):
Through May 8.

There is no closed season or bag limit for groundhog, coyote, striped skunk, nutria and armadillo. There is an open season for taking beavers with firearms or bow and arrow during any other open season for the taking of wild animals.

Check the *2010–2011 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

Survey: Anglers Also Face Loss of Acces

Access to areas to enjoy their sport has long been considered a challenge faced largely by hunters, but results of a recent survey reveal that anglers also face some of the same obstacles. When asked by Southwick Associates' AnglerSurvey.com if, in the past year, they had to cancel a trip or stop fishing a particular area because they could no longer access it, 19.5 percent of those anglers interviewed said they had. Those numbers remained largely consistent with results to the same question the previous year.

Most of those concerns (81.5 percent) in the 2010 survey, which measured angler experiences from 2009, involved freshwater fishing locations where low water levels due to drought or lake drawdowns, pollution generated from excess runoff as a result of storms, boat ramp closures and limited public right of entry points can all contribute to limited angler access. Interestingly, only 19.7 percent of access concerns affected saltwater anglers that year, but in the January 2011 survey (which measured angler experiences from 2010), that number jumped to 24.8 percent, an increase of more than five percent.

While the survey did not examine causes for limits on access, 2010 witnessed several issues impacting saltwater fishing. Chief among these were the BP oil spill i Gulf of Mexico, which closed down much of the gulf to fishing through much of last su bottom-fishing closures in the Southeast, and additional permanent sport fishing c along the California coast. These may have led to the jump in saltwater access issu

"These closures impact not only anglers, but businesses and families along the that depend on sport fishing," said Rob Southwick, president of Southwick Asso which specializes in economic and business statistics related to fish and wildlife. " people want to fish, but have to cancel because they are unable to access decent fishing we see a greater deterioration of jobs, tax revenues and commerce in general. An need to stay in touch with fisheries agencies and sport fishing groups to minimiz future problems."

Home from the Hunt

Home from the Hunt, a statewide safety campaign, encourages everyone to enjoy their time outdoors in North Carolina by being prepared and taking the proper precautions, especially with firearms.

Firearms safety is an element of the Hunter Education Program of the N.C. Wildlife Resources Commission. North Carolina requires all first-time hunting license buyers to have first completed a hunting education course. More than a gun safety class, hunter education courses include instruction in hunter ethics and responsibility, conservation and game management, wildlife identification, survival and first aid, and specialty hunting.

Hunting Educators advise that safety directly pertains to how you handle firearms of any type:

Treat each firearm with the respect due a loaded gun.

Point a firearm in a safe direction at all times.

Keep your finger off the trigger until rea to shoot.

Follow manufacturer's instructions for c ing and proper storage.

In the off-season, it is important f hunters to maintain firearm proficien Take this time to build and practice ma manship skills.

"Firearms safety is exercising caut and using your head," said Travis Cas the state assistant hunting education c dinator. "You can't be too careful. Alv maintain muzzle control. Follow manu turer instructions, obey regulations a put into practice what you've learned hunter education, no matter what typ firearm or archery equipment you're us

To learn more about the Hunter Ed cation Program or to check course av ability, visit www.ncwildlife.org/Hunt H_Hunter_Ed_Course.htm or call (919) 707-0031.

The Wildlife Endowment Fund

An Investment for the Future

Established in 1981, the Wildlife Endowment Fund allows the Wildlife Resources Commission to accept tax-deductible contributions for wildlife conservation. Money from the sale of lifetime licenses is also placed in this fund. Your donation or purchase will ensure that North Carolina will have a rich wildlife heritage for generations to come.

Lifetime License Form

Infant and Youth *(check appropriate block)*:

- ☐ Sportsman Infant $200
  (under 1 year old—Application must be received before applicant has attained 1 year of age.)
- ☐ Unified Sportsman/Coastal Recreational Fishing Infant $275
  (under 1 year old—Application must be received before applicant has attained 1 year of age.)
- ☐ Sportsman Youth $350
  (ages 1 through 11—Application must be received before applicant has attained 12 years of age.)
- ☐ Unified Sportsman/Coastal Recreational Fishing Youth $450
  (ages 1 through 11—Application must be received before applicant has attained 12 years of age.)

A copy of the birth certificate must accompany applications for infant and youth licenses. Birth certificate documentation cannot be returned.

Note: Pending satisfactory completion of the hunter safety course, persons who possess infant or youth licenses may exercise the privileges thereof when accompanied by an adult who is properly licensed to hunt in North Carolina. "Accompanied" is defined as maintaining a proximity to the hunter which enables the adult to monitor the activities of, and communicate with, the hunter at all times.

Adult (age 12 or older) *(check appropriate block)*:

- ☐ Comprehensive Inland Fishing. $250
  (N.C. residents only—includes basic inland fishing, trout & trout waters on game lands)
- ☐ Comprehensive Hunting. $250
  (N.C. residents only—includes basic hunting, big game, game lands & N.C. waterfowl)
- ☐ Sportsman. $500
  (N.C. residents only age 12 or older—includes basic hunting & inland fishing, big game, game lands, trout & N.C. waterfowl)
- ☐ Coastal Recreational Fishing $250
  (N.C. residents only—includes coastal recreational fishing)
- ☐ Unified Sportsman/Coastal Recreational Fishing $675
  (N.C. residents only—includes same privileges as the Sportsman, plus coastal recreational fishing)

A federal waterfowl stamp must be purchased separately for all N.C. hunting licenses.

Note: On or after July 1, 1991, a person, regardless of age, may not procure a hunting license or hunt in North Carolina without producing a certificate of competency for completing the hunter safety course or a hunting license effective prior to July 1, 1991, or by signing the statement below that he or she had such a license.

Check appropriate block and attach required copy:

- ☐ Copy of Prior Year Hunting License
- ☐ Copy of Hunter Safety Certificate of Competence
- ☐ In lieu of copy, I am signing the statement below:

Statement: I certify that I was a licensed hunter prior to July 1, 1991.

Signature _____ Date _____

Visit us online at www.ncwildlife.org or call 1-888-248-6834 for a complete list of lifetime licenses, including those for nonresidents and 65 and older.

Lifetime License

Complete the following information if applying for a lifetime license. Be sure to check appropriate block(s) on reverse side *(please print legibly)*:

Name of Applicant _____

Daytime Phone _____

Mailing Address _____

Resident Address _____

County _____ Date of Birth _____ Driver License # _____

E-mail Address _____

Is this license a gift? ☐ Yes ☐ No If yes, mail license to ☐ Donor or ☐ Applicant.

License Donor's Name *(if applicable)* _____

Donor's Telephone # _____

Donor's Mailing Address _____

City _____ State _____ Zip _____

Method of Payment: ☐ Check ☐ VISA ☐ MasterCard

Acct. # _____ Expires _____

Print name exactly as it appears on credit card _____

Cardholder's Signature _____ Date _____

Personalize your Lifetime License for an additional $5:
Indicate your selection of letters, numbers, dashes, periods, commas and /or blanks up to 6 spaces: ___ ___ ___ ___ ___ ___

Indicate your personal message including letters, numbers, dashes, periods, commas and /or blanks up to 21 spaces:

___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
___ ___ ___ ___ ___ ___ ___ ___ ___ ___

Signature of Applicant or Donor _____ Date _____

Note: Only adult lifetime licenses may be purchased by phone or online (VISA or MasterCard only). Call toll-free (1-888-248-6834) or visit us at www.ncwildlife.org. Use this form to purchase infant and youth lifetime licenses by mail.

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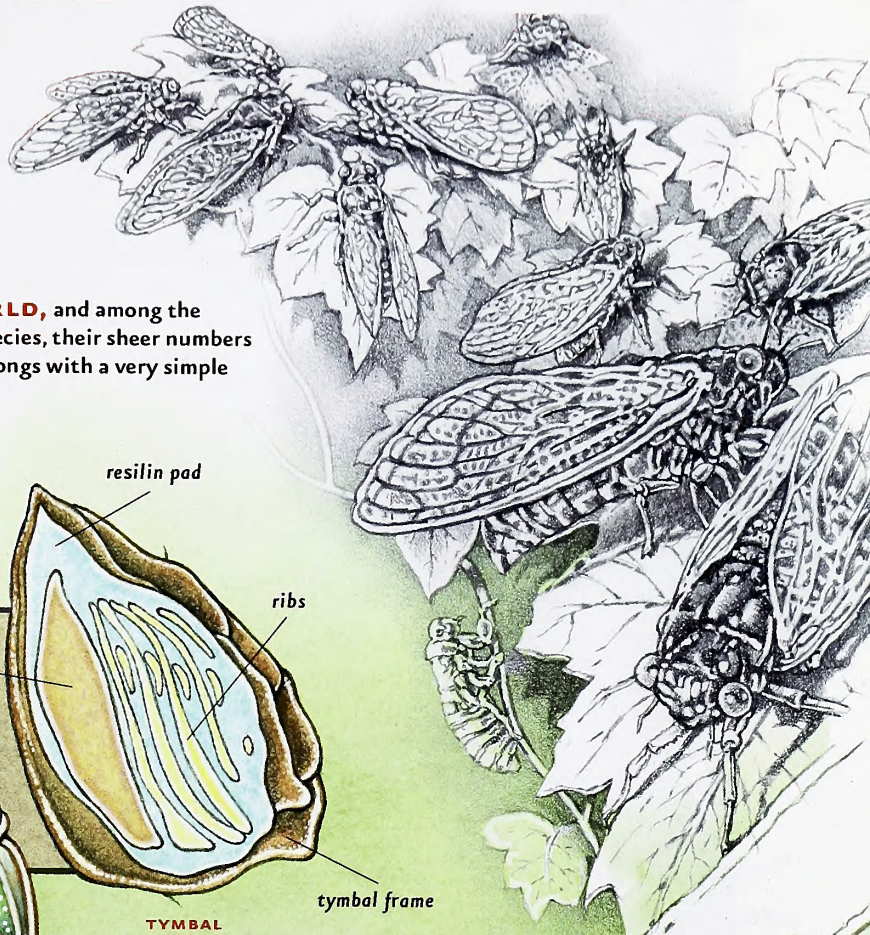
Mail completed application and payment to:
NCWRC, License Section, 1707 Mail Service Center, Raleigh, NC 27699-1707

Office location: *NCSU Centennial Campus, 1751 Varsity Drive, Raleigh, N.C. 27606*
Telephone: 1-888-248-6834 (2HUNTFISH)

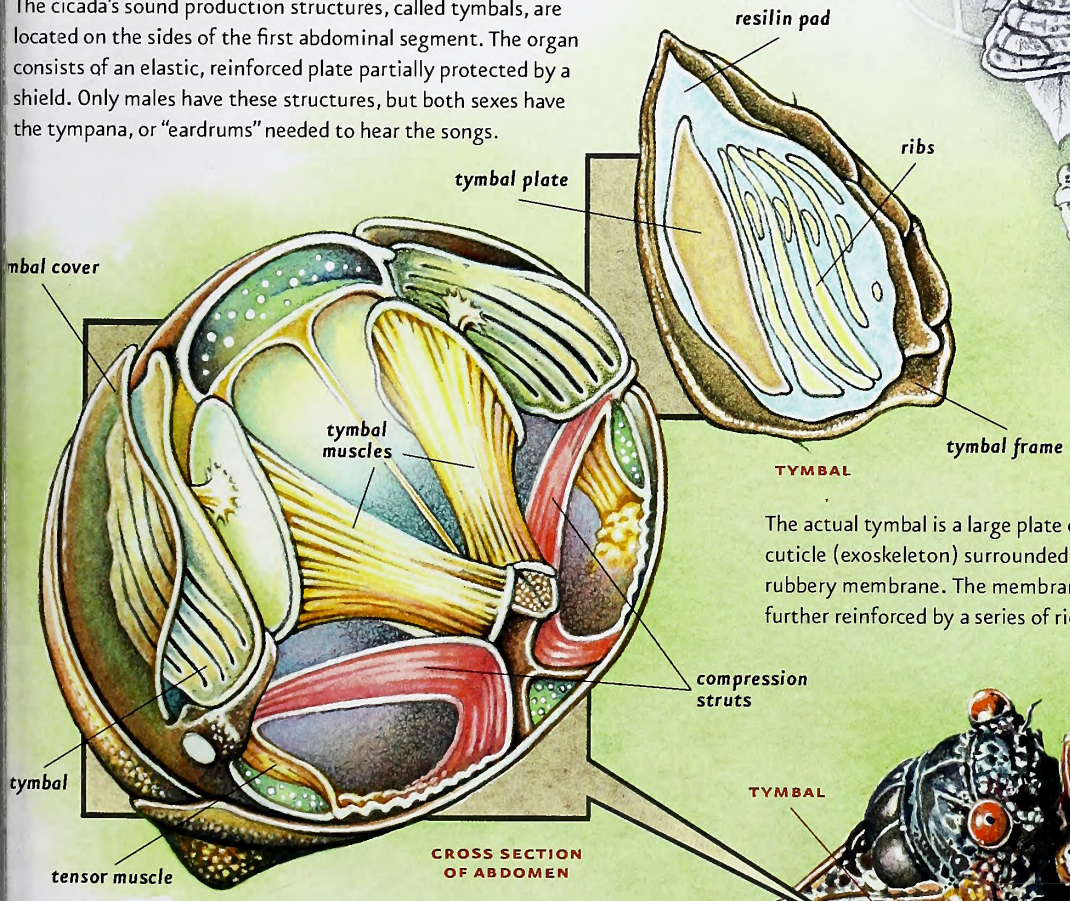
How Do Little Cicadas Make Such Loud Sounds?

itten by Clyde Sorenson
ıstrated by Jim Brown

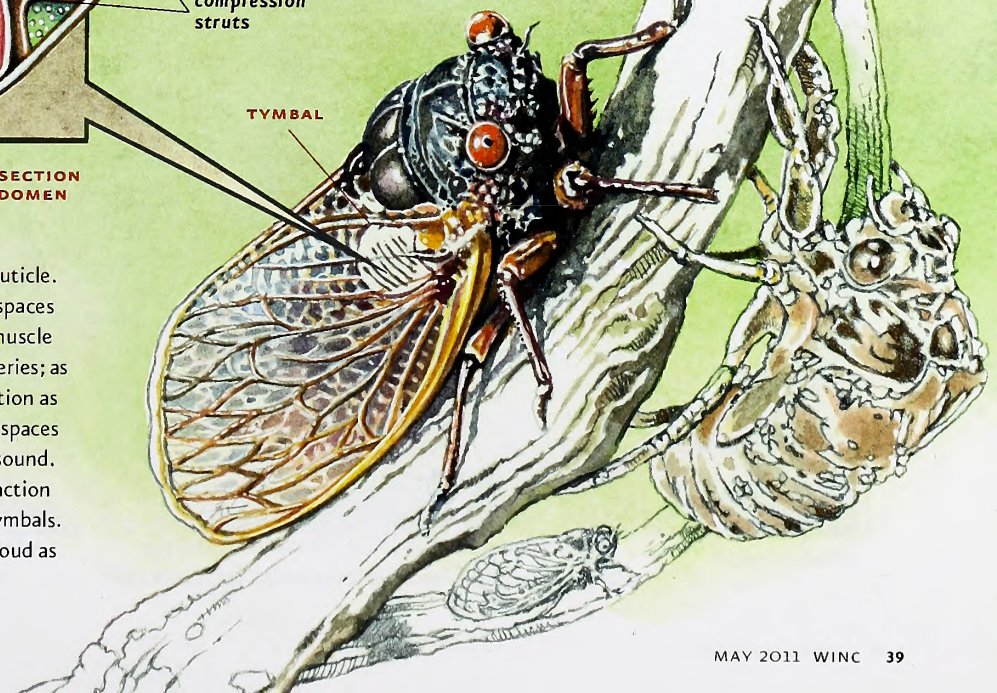


ICADAS ARE THE LOUDEST INSECTS IN THE WORLD, and among the udest animals. While periodical cicadas are not the loudest species, their sheer numbers ake their collective sound overwhelming. Cicadas make their songs with a very simple evice that can produce some pretty sophisticated sounds.

The cicada's sound production structures, called tymbals, are located on the sides of the first abdominal segment. The organ consists of an elastic, reinforced plate partially protected by a shield. Only males have these structures, but both sexes have the tympana, or "eardrums" needed to hear the songs.



The actual tymbal is a large plate of rigid cuticle (exoskeleton) surrounded by a rubbery membrane. The membrane is further reinforced by a series of ridges.



tymbal is attached to a massive muscle by a strut of cuticle. ese muscles can contract at extremely high rates. Air spaces round the strut and lie under the tymbal. When the muscle tracts, the ridges and the tymbal bend, or deflect, in series; as h flexes, it makes a popping sound; the air spaces function as onators. Additional, small muscles surrounding the air spaces nge the resonators' shapes, changing the pitch of the sound. cicada also can change the song by varying the contraction of the main muscles, and the synchrony of the two tymbals. ne tropical cicadas can reach 120 decibels — about as loud as t engine — with these sound-producing instruments.

Fish Food

written by Jim Dean

For someone who loves to fish as much as I do, I am oddly ambivalent about eating my catch. It's not an ethical or environmental thing, but it is a bit embarrassing. I simply don't like the fishy taste of many fish, and I might as well also admit that nothing creeps me out like a mouthful of tiny bones. That's all the more ironic since I relish oysters, shrimp, crabs, lobster, crawfish and clams, even snails.

JIM DEAN

I like some fish, particularly broiled or fried sea trout or flounder, or a big chunk of blackened grouper or snapper. But you will notice that these are not "fishy" tasting species, and their bones are easily removed. Even fewer freshwater fish pass my weird and arbitrary "fishy or bony" test. I like walleye (most of us do), and I will eat a largemouth bass that has been filleted and skinned (that muddy taste is in the skin). However, I usually pass up trout, bluegills and other panfish in favor of a boneless fish stick (whatever that is). Crazy, huh?

"Indeed, little consideration seems to be given nowadays to the fact that humans have evolved as omnivores well adapted to eat a wide variety of foods."

I am justifiably teased about this quirk, just as I was as a kid when I used to pick all the seeds out of my tomatoes (I got over that). Maybe it's just a lingering bit of childhood fussiness—family legend has it that I took a nap when I was 2 years old with a green pea in my mouth rather than "eat just one" as my mother had commanded. When I woke up, she hooked the decomposing pea out of my mouth with her finger, and observed with exasperation that I would rather taste that miserable pea for an hour than swallow it. I didn't eat many fish as a child, either.

So you can imagine my surprise last summer when I sat down to a platter of fresh-caught fried sea mullet with my friends Tommy and Ginny Jones from Marshallberg. Sea mullet are tasty—I'll admit that—and I poked at mine, picking out bones.

Meanwhile, Ginny grabbed a mullet and bit off the entire front end, bones and all. She chewed contently, sighed with pleasure, and took another bony bite.

"How can you do that?" I asked, astonished.

"Law, Honey, O'i was raised down here," she replied. "Fish bones don't bother me."

How refreshing, I thought admiringly.

My issues with fish, alas, seem to be deeply ingrained and probably irreversible. Yet, it seems to me that our evolving eating habits invite further discussion.

It is one thing to say you don't like the flavor of fish—or brussels sprouts or liver or wild game—but it's bad form, and useless, to argue with someone about matters of their personal taste. If they've tried those things—green peas come to mind—and still don't like them, who can argue with that?

In recent years, however, lots of people have adopted eating preferences that have nothing to do with how something tastes. For example, many folk have made the choice not to eat red meat, or any me for that matter. Some consider it unhealthy; others object to hunting or the way animals are raised for food. Some eat only organic or locally grown food; others become vegans or eat only raw foods. Our reasons may be largely related to concerns about health and food safety, but they also reflect sociopol tical issues and how we each interpret environment ethics. Indeed, little consideration seems to be giver nowadays to the fact that humans have evolved as omnivores well adapted to eat a wide variety of food

Perhaps it is not a matter of who's right or wrong so much as it is a matter of personal choice. And choice, like taste, is more difficult to dispute. Yet, I am puzzled by the actions of a small, but apparently growing and vocal, contingent of fishermen.

If I had but one day left to live, I would likely choo to spend it casting flies for rainbow and brown trou Fly-fishermen originally launched the concept of catch and release, and that practice has spread throughout the angling world with beneficial result Turning fish loose has improved fishing, especially for stressed populations.

It is ironic, however, that some fishermen—mar of them fly-fishermen who one suspects are newly baptized in the faith—have elevated this wonderful management tool to near religious fervor. These stride converts not only release every fish they catch, the clamor to impose this ethic on every other angler. They make no distinction between species that mig benefit from this practice and others that are historical abundant over a wide and increasing range and well protected by regulations. Fly-fishing magazines, parti ularly, get a depressing volume of self-righteous lette denouncing those who might ever keep any legal fis

Heaven forbid that anyone might choose to catch a doomed hatchery trout on a worm or Jolly Greer Giant niblet and keep it to eat.

It's enough to improve my appetite for fish.

LEE BOTTOMS

OUTDOOR MOMENT

Eastern cottontail

IN THE JUNE ISSUE

MELISSA McGAW / NCWRC

FIGHT AND FLIGHT

The endangered Saint Francis' satyr thrives in an odd ecological niche: military artillery impact zones.

A FATHER AFIELD

A biologist teaches his dad to enjoy and appreciate all kinds of wildlife by taking him on photography field trips.

BIG REPTILES

Leatherbacks, the world's largest turtles, have been documented as nesting on North Carolina beaches.

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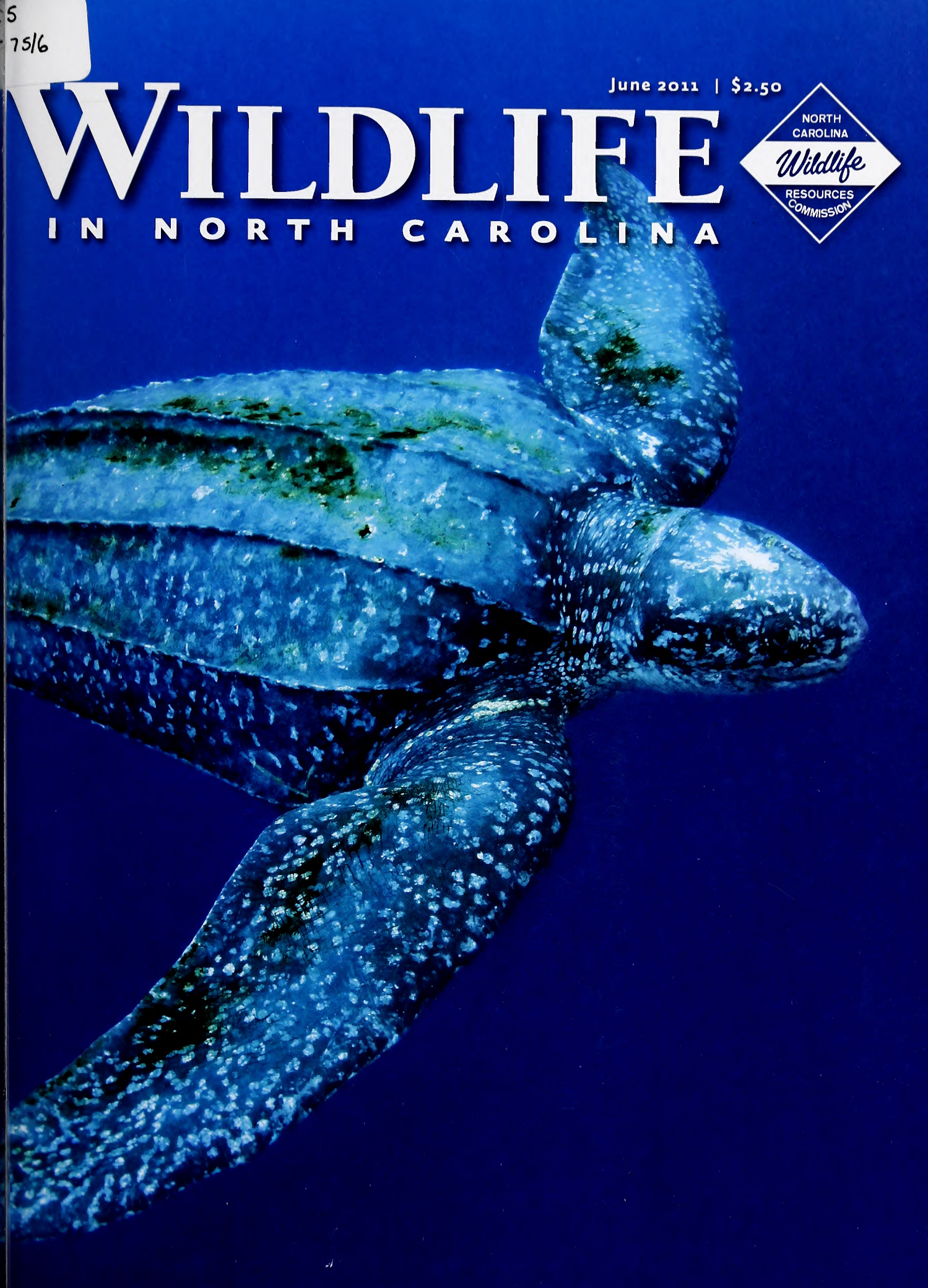

A researcher marks the wing of an endangered St. Francis' satyr butterfly with a permanent marker. The markings enable scientists to more easily track individuals.

PHOTOGRAPH BY MELISSA MCGAW/NCWRC.

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Cover: The leatherback sea turtle is mainly a pelagic animal, but it also forages in North Carolina coastal waters for its favorite prey, jellyfish. PHOTOGRAPH BY MICHAEL PATRICK O'NEILL/OCEANWIDEIMAGES.COM.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

I have written before about how much I love June. Its weather is more reliably warm than May, and not as hot as July. School is out, and my birthday is at the end of the month. What's not to like?

MELISSA MCGAW/NCWRC

June is an outstanding month for outdoor excursions. Fishing, hiking, crow or coyote hunting, wildlife watching, boating, planting dove fields and dozens of other activities are perfect for this month. If Mountain trout fishing is your thing, there's a good chance you will hook a fish that was raised in one of the N.C. Wildlife Resources Commission's fish hatcheries. The commission stocks almost a million trout per year in Mountain streams and lakes, many of them catchable-sized and all of them sterile (known as triploid in the scientific vernacular).

As Jim Wilson mentions in the final installment of his three-part series on fish propagation in North Carolina ("Fish by the Millions," page 20), the Wildlife Commission has pretty much perfected the science of raising triploid trout. Fish biologists such as Peter Lamb, shown in the photo, place fertilized trout eggs into a stainless steel hydrostatic pressure chamber for a few minutes. Pressures as high as 10,000 pounds per square inch alter the chromosomes of the eggs, rendering them triploid and sterile.

Stocking only triploids ensures that hatchery fish will not mix their genetics with wild fish such as the Southern Appalachian brook trout, keeping the wild genetic lines pure while providing lots of fish for anglers.

This issue also contains a number of other ideas for June outings: take a parent wildlife watching ("Field Trips with Dad," page 10); look for giant sea turtles on the Outer Banks ("A Whale of a Turtle," page 16); canoe the Nolichucky River ("Blue Ribbon Stream," page 26) or get started taking photos to enter in the *Wildlife in North Carolina* 2011 Photo Competition (rules and categories, page 30).

Whatever you do, find a way to enjoy June outdoors. You know that I will.

Greg Jenkins

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Dear reader:

Seasons change, and so does *Wildlife in North Carolina* magazine. When it was created in 1937, the magazine was little more than an eight-page, digest-sized newsletter. In 1948, a year after the N.C. Wildlife Resources Commission was formed, the magazine became a monthly publication.

Recent trends in magazine readership and state government funding, as well as the occasion of our 75th anniversary, motivated us to take a step back and assess the way we operate. We needed a business model that would be sustainable through the changing times ahead.

When we move to a bimonthly schedule in July, you will receive the same quality publication that this agency's magazine staffers have worked to produce for more than seven decades. In addition, subscribers will receive our new fall and spring outdoor guides at no additional cost. These two guides will contain lots of content that will help enhance your hunting, fishing and boating experiences, including advertising from providers of outdoor-related products and services.

Every subscriber who paid for 12 issues will receive 12 issues—it will just take a little longer to receive them. Likewise, every subscriber who paid for 36 issues will receive 36 issues. And all subscribers will receive the guides. In fact, subscribing to the magazine is the only way to get the guides, which we think will be an excellent complement to the content we already offer.

We are confident that you will appreciate these changes and the stability that they bring. I assure you that one thing will always remain the same: our commitment to bringing you the best in outdoor writing and photography—and the most bang for your buck.

Sincerely,

Greg Jenkins

Greg Jenkins, Editor

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edy Good

o admit that I did more than just chuckle e Sorenson's article "How Not to Kill a (April 2011). This story sounded so famil- ought he was writing about me. I am s old. I started turkey hunting 14 years d have encountered quite a few birds, hich usually went away very quickly. nson's tale was stuck in my head, even ered the woods on opening day this year. sed myself I would hunt by the book. hour later I was walking back to the ith my first wild turkey. It was a jake, as as proud as if it was an adult tom. I give some of the credit to *WINC* and n. The article was both entertaining ormative. Thanks so much.

Pete Golfetto
Mint Hill

g High

w! Kudos for the Doug Elliot article on tails ("Swallowtails, Snakeroots and orns," April 2011)! Very nicely done and e to have something really different in gazine!

Judi Gustafson
Forest City

ning It

t read Jim Dean's fine article "Real g" in the April issue, and took a won- nostalgic journey back in time while doing so. Like the author, I also developed a lifelong love of camping out during my early years in the Boy Scouts. Even considering things like tents with no floors, warmed up pork and beans to eat, and the occasional sunburn, Scouting and camping helped give me a good foundation for life.

Through the years, my wife and I continued to camp, and our two sons grew up camping. We now have a 1-year-old grandson who camps with us. We've graduated to an RV with air conditioning, microwave, TV, soft beds, etc., yet my experiences of "real camping" provide some of the fondest memories of my childhood.

Great article. Love your magazine. Keep up the good work!

Rick Blanton
Casar

Night Bite

I am a lifetime subscriber to your excellent magazine, and eagerly await its arrival each month. I read with amazement Jay Barnes' article "Beware the Viper Next Door" in the April 2011 edition. He described, nearly identically, my encounter with a copperhead seven years ago, so much that I thought he must have been videotaping me at the time. The only difference was that I didn't cover the grill at 10:17 p.m., but I took out the garbage instead. I can attest that catching the critter wasn't necessary and wasted precious time in getting to the WakeMed emergency room. My medical bills didn't amount to the figures quoted in the article because no antivenom was necessary—I got a dry bite. But the doctor insisted on a foot X-ray to ensure that no fangs had broken off. Still, the experience cost me several thousand dollars, and the wound was painful. I've never worn flip-flops since.

Michael V. Maieli
Raleigh

Lovely Lady

I just wanted to thank you so much for your article on Boykin spaniels ("Small Package, Big Dog," March 2011). When I was 8, my father let me pick out my first pup from a friend's litter of Boykins. Lady was quite a dog. All she cared for was being a big old baby, swimming and hunting birds. She was a crazy little girl, but she could point out a bird in a split second. I never knew that we had grouse or pheasants before we had her, and I haven't seen one since. Your article reminded me how very special Lady was, and I think I might have to get another Boykin and start bird hunting again. Thanks so much! Boykin spaniels are amazing!

Susannah Sides
Address withheld

Cold-Blooded Correctness?

I practically devoured the article about spotted salamanders by Bob Palmatier ("The Mating Dance of the Spotted Salamander," Feb. 2011), partly because I love nature and partly because I know someone who experienced a phenomenon similar to what Palmatier describes.

Then in the middle of the article came the demeaning section as the men "negotiated" for the right to go out on the search. They had to seek permission from their wives. And then the last paragraph took the cake. Once again "man has plundered" the world. I have been an avid reader of your magazine for many years and I have noticed political correctness slowly creeping into many of your articles. I wonder how these salamanders have survived when "Mac" (a man) lives on the very property where they were observed! I also wonder if Palmatier gives credit to humans for the tax money and other contributions used to save, restore and establish areas for animals to live, breed and survive.

I would like the magazine to publish articles that are balanced, not politically correct, or else I fear this magazine will go the way of the dinosaurs as many others have.

Kathleen Beil
Durham

rite us

tters should be sent via e-mail to **letters@ncwildlife.org** *or through regular mail to Letters, Wildlife in North Carolina magazine, 1712 Mail Service Center, Raleigh, NC 27699-1712. ease include your name, address and daytime phone number. Letters chosen for publication may be edited for clarity and length.*

BULLETS, BOMBS & *Butterflies*

Biologists are working on a rescue plan for the St. Francis' satyr, an endangered butterfly that lives only in artillery impact zones at Fort Bragg.

When N.C. State University biology professor Nick Haddad first began working to restore the imperiled St. Francis' satyr butterfly on Fort Bragg seven years ago, he started entirely from scratch.

"Nobody even knew what its larval host plant was," Haddad said. Which, in butterfly lingo, means no one knew squat about the cocoa-colored, quarter-sized insect.

Knowing the host plant would tell scientists what kind of habitat the butterfly uses to reproduce, because most butterflies lay their eggs on the same plant that their larval caterpillars eat. So Haddad began the painstaking process of decoding the imperiled insect's life history: figuring out where the adults laid their eggs in the wild, when the larvae hatched, what the caterpillars ate and where they might be on Fort Bragg, which happens to be the only place in the world this rarest of Eastern butterflies lives.

"A lot of our work has been sleuthing to reconstruct its historic habitat use and how that habitat was maintained," Haddad said. "It turns out that the St. Francis' satyr has this love-hate relationship with beavers, water and fire."

Only a few hundred years ago, when longleaf pines covered 90 million acres from Virginia south to Florida and west to eastern Texas, the St. Francis' satyr likely lived in sedge meadows that overtake deep, mucky sediments left behind when a beaver dam fails. Sedges of the genus *Carex* fan out over saturated mud and grow into thick, long-bladed meadows. Small fires that historically maintained the longleaf pine system also preserved the meadows within the pine systems by preventing new hardwoods from growing, which kept sunlight flooding through large gaps in the forest canopy.

"The early explorers describe walking along creeks in this area, and they would literally see evidence of beavers everywhere," Haddad said. "They'd see an active dam in one spot, an abandoned dam in another and further up, signs that beavers had cut down trees—there was this constant disturbance of beavers flooding, abandoning and reclaiming areas along creeks."

But now that our longleaf pine ecosystems are whittled down to 3.4 million acres, less than 4 percent of their former range; beavers have been pushed out of many areas; and the natural fire regime has gone up in smoke, the St. Francis' satyr has adapted by developing a curious dependency upon the artillery impact zones of Fort Bragg. Where soldiers lob bombs into the forest and train on small- and large-weapons systems, incendiary devices spark small fires that mimic the natural regime of old and maintain remnant pockets of humid sedge meadows.

"The artillery impact zones are actually some of the best areas in all of Fort Bragg for this species," Haddad said, as long as there is water to maintain the muck and grow the sedges they need.

A forest riddled with bullets and bombs might seem an imperfect spot for a butterfly with paper-thin wings and legs slimmer than silk thread, but the St. Francis' satyr's story is full of quirky contradictions.

WRITTEN BY T. DELENE BEELAND
PHOTOGRAPHED BY MELISSA McGAW

DISCOVERING A NEW SUBSPECIES

The butterfly was first discovered on Fort Bragg by an off-duty soldier who happened to be an amateur insect collector. Thomas Kral whisked his butterfly net in a muddy meadow and caught the first St. Francis' satyrs on the evening of June 2, 1983. He knew a lot about butterflies, but he didn't know this particular one. It was cocoa brown, and its wings were rimmed in a rusty orange double stripe. The wing scales seemed to give way to tiny hairs projecting off the wing's lip. Its lower wing had five or six silvery eyespots edged in yellow and daubed with metallic blue in the middle. The upper wing held three or four similar eyespots. Two widely spaced rusty orange stripes raked top to bottom from forewing to hindwing. To someone who prefers flashy colors and patterns, the brown butterfly might have appeared plain. But the more you study its colors and rusty orange stripes, the more it beckons like an unassuming, rough-hewn jewel.

Kral netted five that night, which he added to his collection of 25,000 butterfly specimens. Six years later, Kral co-authored an article in the *Journal of the Lepidopterists' Society* naming and describing the new species as *Neonympha mitchellii Francisci*.

Research assistant Samantha Walker nets a St. Francis' satyr. Cloth-covered pots contain the sedge that hosts satyrs in various life stages from caterpillar to chrysalis.

Taxonomically, it was a subspecies of the Mitchell's satyr, which is known from Michigan with several newly found relic populations in Virginia, Alabama and Mississippi.

But Kral and his co-author, David Parshall, chose to name it *Francisci* as a nod to St. Francis, whom most people know as the patron saint of animals and the environment. But St. Francis of Assisi, who died in 1226, is also the patron saint of merchants. So perhaps it only makes the butterfly's story even more compelling that Kral was busted in 1992 by the U.S. Fish and Wildlife Service in one of the biggest butterfly collecting stings to date for illegally poaching and selling protected species. The 1,600 specimens agents seized from his home in Tucson, Ariz., were reported to equal about 2 percent of his 80,000-strong personal collection. Though he is rumored to have had many St. Francis' satyrs in his collection at that time, it was not yet illegal to possess them.

In 1995, Kral was convicted under the Lacey Act, fined $3,000 and given 300 hours of community service doing educational outreach about wildlife protection laws.

Also in 1995, the St. Francis' satyr was formally listed under the Endangered Species Act (ESA). It had been rumored to be extinct in the wild, or teetering close to it, mainly due to over-collecting compounding its dwindling-habitat threats. But more of the cocoa brown critters had turned up alive and well, in the nets of Stephen Hall, an invertebrate zoologist with the N.C. Natural Heritage Program, he was doing surveys in 1992 in Fort B productive wetlands.

"All I had was a rough sketch map Parshall had given us showing where butterfly had been found on the base," said. "When I finally re-located the ori population site, they were still there, alth I only saw three or four individuals or first trip."

Erich Hoffman, of Fort Bragg's Endar Species Branch, and Hall found two new ulations that summer and documented eral more in 1993. Hall checked up and the Coastal Plain, and in the Sandhill but never netted any off the base. He w with Hoffman on early studies of the b fly's habitat, and the pair did the legwo get the insect emergency-listed under ESA in 1994.

In 2000, they passed the butterfly to Haddad. "We were really glad whe showed up and seemed to have a stro interest in its conservation," Hall recal

A BLUEPRINT FOR RECOVERY

Onc Hoffman and Haddad pieced together th toric habitat of St. Francis' satyrs, Hac and Brian Ball, a civilian biologist with Bragg's Endangered Species Branch, b mapping out a three-pronged recovery gram for the species. One line of wor involved figuring out husbandry techn to captive-rear caterpillars in an effort t

full-scale captive breeding. A second work entailed investigating how to habitat on Fort Bragg, and a third ed mapping and monitoring known es on the base.

last turned out to be the trickiest e people aren't allowed in the artillery zones the butterfly favors. Haddad and spect that the butterfly's habitat lies 50 percent inside and 50 percent out- e zones. "But numerically, it's probably percent of the butterflies are inside and ent are outside," Ball said. The pair d permission twice to enter the zones e in summer 2009 and once in summer nd only for a few hours—to survey. ad so many sites we were trying to get were literally running all day. Well, as you can run in mud," Ball joked.

biggest differences they noticed in the t inside the impact zones compared to e were the lack of roads, unbroken es of creeks and huge expanses of canebrakes. The base's four impact total about 33,039 acres ringed by 83 anges. Inside the impact zones, cane- several hundred yards long often red hundreds to perhaps a thousand ncis' satyrs. And when Haddad parted es and peered at the ground beneath, l was carpeted in a green sea of *Carex*. of the canebrakes outside the impact have *Carex* sedges growing below them, addad and Ball have never found the in them.

is is purely speculative, but I think fire a big role inside the artillery impact " Haddad said. "I think that the giant carry fire over their tops, which would t the sedges from burning below, but it also limit the cane's growth and keep ouring down to the grasses below."

t Bragg maintains a three-year burning to maintain its 120,000 acres of forest, ddad suspects that the smaller incen- sparked fires inside the impact zones he habitat structure in a different way, more favorable to St. Francis' satyr sur- The habitat differences are "like night ly," he said. "There is this unknown box of the artillery impact areas. And what I've seen after visiting out there mmer, they are some of the best areas butterfly to be. What we saw in there pressive."

ddad and Ball found a single robust that might have numbered 1,000 individuals inside the impact area, whereas the three known sites outside the impact area number between 100 and 400 individuals each.

Fort Bragg's 650 miles of creeks also play a role in the butterfly's genetic diversity. Haddad suspects that dispersing adults fly along the creeks and use them as corridors to get to new habitat or existing colonies. The boundaries to the butterfly's dispersal so far seem to coincide neatly with the edges of wetlands. The insect rarely flits into developed habitat or crosses open fields.

"It seems to really like this mosaic habitat of some open canopy and sedges, and some nearby shaded shrubs," Haddad said. "It darts between the two." In other words, the St. Francis' satyr is a denizen of intermediate disturbance. It likes things mucked up just so—an abandoned beaver dam will do for a home, as the community succeeds to meadow—but a new beaver pond is its bane because, well, caterpillars can't swim. And the species likes a little bit of fire to keep the canopy open, but not so much that the sedges fry completely.

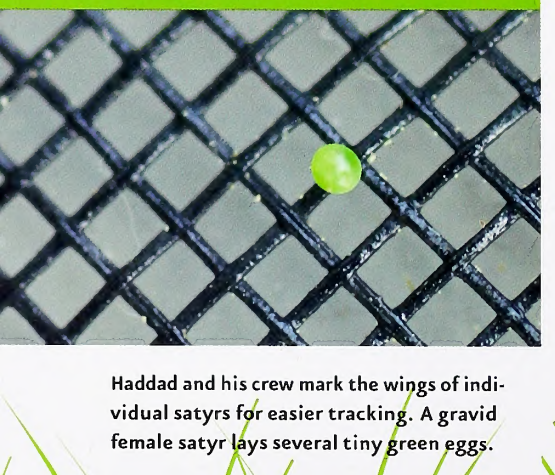
This satyr is the Goldilocks of butterflies, needing habitat that's just right.

Johnny Wilson, a student working in Haddad's lab, used remote sensing such as LIDAR (Light Detection and Ranging) and aerial imagery to analyze Fort Bragg and other public lands in North Carolina for suitable St. Francis' satyr habitat. The technique helped rustle up two good sites inside the impact zones. His analyses suggest that there might be a little less than 250 acres of land on Fort Bragg that could be potential habitat for the St. Francis' satyr. By contrast, the species' known habitat takes up about 10 acres outside the impact areas, and 25 acres inside the artillery impact zones—on a base that spans more than 160,789 acres.

If the researchers can get the powers-that-be at Fort Bragg on board, Haddad hopes to fill the potential habitat with captive-bred butterflies. In fact, he and Ball are already working out the husbandry formula in a secret lab in the woods.

BREEDING NEW LIFE By practicing first with Georgia satyrs, Haddad, Ball and several students have perfected collecting the eggs from females and growing them out into caterpillars and adults. The St. Francis' satyr has two "flight periods" each year. The first is from mid-May to mid-June, and the second is from late July to August. Both last for about

N.C. State University professor Nick Haddad checks a butterfly pot for adult satyrs that might have emerged. Above, a St. Francis' satyr chrysalis. Bottom, an adult newly emerged from its chrysalis.



Haddad and his crew mark the wings of individual satyrs for easier tracking. A gravid female satyr lays several tiny green eggs.

three weeks. During this time, the butterflies live in their adult form for about four days. They mate, and the females lay eggs.

Unlike other butterflies, the adults do not sip nectar. In fact, Haddad suspects they eat nothing at all. But during the flight periods, Haddad, Ball and the students walk a system of boardwalks through the mucky meadows, swooshing their butterfly nets and bagging critters right where they perch.

"This butterfly is probably the most sedentary butterfly you will ever meet," Haddad said. "It loves to just cling to a blade of grass and sit there, so we swipe our nets over the sedges to get them to fly."

It is also the only butterfly you might ever meet that takes danger-avoidance cues from opossums. When threatened, it keels over, wings tightly clasped, and plays dead. Yes, the St. Francis' satyr plays dead, righting itself again only when safety seems certain.

Haddad and his team collect the females, which are larger and typically have a swollen abdomen, and put them in clay pots topped with window screens. The pots have a succulent sedge blade growing inside. There, the satyrs are held for 24 to 36 hours in the hope they'll lay eggs. If they do, the team gently lifts the eggs, which are like opalescent green orbs, using fine paintbrush bristles and moves them into a Tupperware container where observers can monitor survival. Usually about half the eggs hatch into larval caterpillars. The team moves the caterpillars onto potted sedges draped in cheesecloth stretched a wire frame. The whole operation takes outdoors in the butterfly's habitat.

Haddad suspects that *Carex mitchel* which is also largely restricted to Fort I is probably the insect's larval host plan he favors using it for the captive reari Enmeshed in gossamer veils of fabric t keep out juice-sucking predators, the c pillars grow and eventually metamorp into adults. About half the caterpillar usually emerge as adults. An adult fem might lay up to 100 eggs, but only abou adults or fewer might be produced fro that genetic material.

"We take two or three adults and p them back into the wild where their m was captured," Haddad said. "We thi this as demographic replacement sinc nabbed the mom to lay eggs in captiv They release the rest in a site they are t to colonize.

Haddad's work is funded by the De ment of Defense, Fort Bragg and the U.S logical Survey, and its budget has incre from $35,000 in the beginning to abo $100,000 more recently.

It's fair to ask why we should bothe this little butterfly. The St. Francis' satyr be considered a sentinel species to me the health and presence of native wet more than 50 percent of which have ditched and drained in the East. Man plants on Fort Bragg are associated wi same habitat that the butterfly uses.

"St. Francis' satyr is currently dwin on the edge of extinction because pe destroyed its habitats by killing beavers, ing wetlands and extinguishing fires," H said. "The butterfly is a North Carolina ure that we have an obligation to see s to recovery. And, just as we had the p to destroy its habitat, we have the pow restore it."

TOP SECRET FIELDWORK Over the mer, Haddad recruits students to live the base and monitor the St. Francis' sites daily. They are sworn to secrecy the field locations. The students walk sects and count the imperiled butterfl in the wild.

One morning in late May, four of hi dents trekked with him into a brushy leaf forest stand. Small turkey oaks po up through wire grass. The party desc

ill to where the soil became less firm, ing into muck and mushy sediment. arms fire popped in the distance, a percussion of "rat-a-tat-tat rat-a-tat- woodpecker drummed and a green lled.

ryone sported boots laced up to their the better to protect against deep muck akebites.

ere is an uncanny correlation between ncis' satyr habitat and cottonmouth ," Haddad said as he warned the group an eye out and not to reach down into l sedge grasses. Just the day before, ne had extended a hand into the w to point at a satyr only to have a mouth shoot out from below, well striking distance.

ubs gave way to bracken ferns, sphag- noss and open expanses of *Carex lliana* and *Carex atlantica*. "These are kinds of plants we suspect the butter- ," Haddad said, balancing on a log only above the water and gesturing down to g-bladed sedges at his feet that were in several feet of spongy sediment. He the end of his long-handled butterfly o the muck. Bubbles of gas leaked from und.

e students were standing in the same of sedge meadow that Thomas Kral had ed through 27 years earlier when he the first specimens of St. Francis' satyr. d worked the site for several months in rt to restore it.

e problem here was too much canopy; eded to get light to the ground," Ball e group. "And it was also drying out. s muck you see saturated now is because dammed areas upstream."

he years since Kral prowled here, the had reclaimed the sedges. So Ball cut gum and maple hardwoods to make n the canopy and let light fall through. n dammed a creek upstream, diverting o flood the meadow in a wide swath of -deep trickling flow. In a topography a few inches of elevation make the nce between muck and dry land, his id the trick.

n, I see one!" someone called. "Wait, an Appalachian brown."

"App brown," as Haddad calls it, is a r-looking species, though larger, but it uch faster than the lackadaisical St. s' satyr. Haddad and the students peered gh their close-range field binoculars at another butterfly darting around a shrub. A King's hairstreak, someone said. They were all itching to spot a St. Francis' satyr flitting across the grasses. Some swooshed their nets across the sedge tops, hoping to rustle one up.

Even if the St. Francis' satyr didn't naturally recolonize the restored site—an existing colony was not too far away—the team would use it to reintroduce captive-bred butterflies. It was enough to know that they had figured out how to mimic beaver habitat and get the sedges to grow.

They piled into pickup trucks and drove to the next site, which harbored the captive-rearing experiments. Haddad and Ball checked a series of potted plants set on a table in the woods while the students scattered across the boardwalks to do their transect walks.

Ball and Haddad squinted into the cheesecloth-laden contraptions. The potted sedges were lined up in pans of water to mimic the saturated soils they thrived in. The caterpillars were cryptic and hard to see; they were the color and shape of a bowed sedge blade. But most of the caterpillars had curled up into snail-shaped chrysalises, and the biologists were waiting for them to emerge as adults. The potted chambers had to be checked carefully each day. Slowly the students trickled over to the table full of cloth-draped pots.

Haddad pulled a few clay pots out from under the table to check on the wild females he'd caught at dusk the night before. He peered into a pot looking for eggs. "She's laid seven," he said. Then he froze.

"Oh, she may be laying right now; watch her abdomen," Haddad exclaimed. "See how it's bending up? That is typical egg-laying behavior."

Everyone crowded around the small table.

"Oh, I can see one! Look at that. Oh my gosh, it's coming out!" Haddad said. The butterfly was inverted beneath the window screen, hanging upside down in such a way that she was exposing the underside of her abdomen and her ovipositor to the people above. She pushed, and the ovipositor gaped open. Out popped a glistening opalescent egg the color of burnished green sea glass.

"There it is!" Ball said.

The students snapped pictures, and everyone oohed and aahed.

"Wow, that was incredible! That was so awesome!" Haddad said, laughing and smiling. "Oh man, she's going to lay another one!"

Haddad scans an area for satyrs as research assistant Andeliene Croce takes field notes. Below, a St. Francis' satyr caterpillar.

She flicked her abdomen back and forth.

"There it is! See it? It's stuck on the window screen. Wait! There's a third one! She's on a roll."

As the students, Ball and Haddad watched over the next few minutes, the butterfly laid nine more apple green eggs that looked like tiny, wet glass beads half the size of a strawberry seed.

Haddad had previously seen four individuals lay eggs in the wild.

"But not from this angle," he said, shaking his head and smiling in awe at the new cycle of life unfolding in the flooded woods of Fort Bragg. ◆

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FIELD TRIPS with DAD

In a bit of a ***ROLE REVERSAL****, it can be a richly* ***REWARDING*** *experience when a* ***SON*** *teaches his* ***FATHER*** *to become a* ***NATURALIST.***

written and photographed by Todd Pusser

I reached down and gently picked up the glossy black-and-white serpent off the road. True to form, the Eastern kingsnake made no effort to bite my hand. Instead, it slowly wrapped its elongated body around my wrist, constricting its coils to maintain its grip. Its iridescent scales shimmered in the late afternoon light.

I looked over at my father, who was standing next to me, and asked, "Would you like to hold it?" I knew the answer before I asked. "No" was his immediate response. Perhaps many of you can relate: My father comes from the school of thought that the only good snake is a dead snake. Ever since I can remember, any snake found in the family yard, no matter the species, was considered to be venomous and was promptly dispatched by Dad with a deft stroke of a shovel.

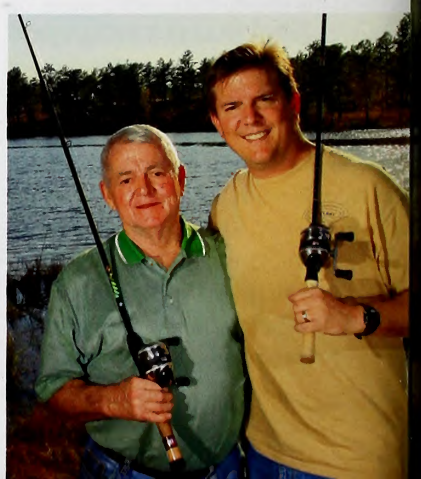
As I matured, I learned that not all snakes found in our yard were venomous, so I would plead with Dad not to kill them. Sometimes, if I whined long enough, he would relent and allow me to catch them and move them unharmed into the nearby forest.

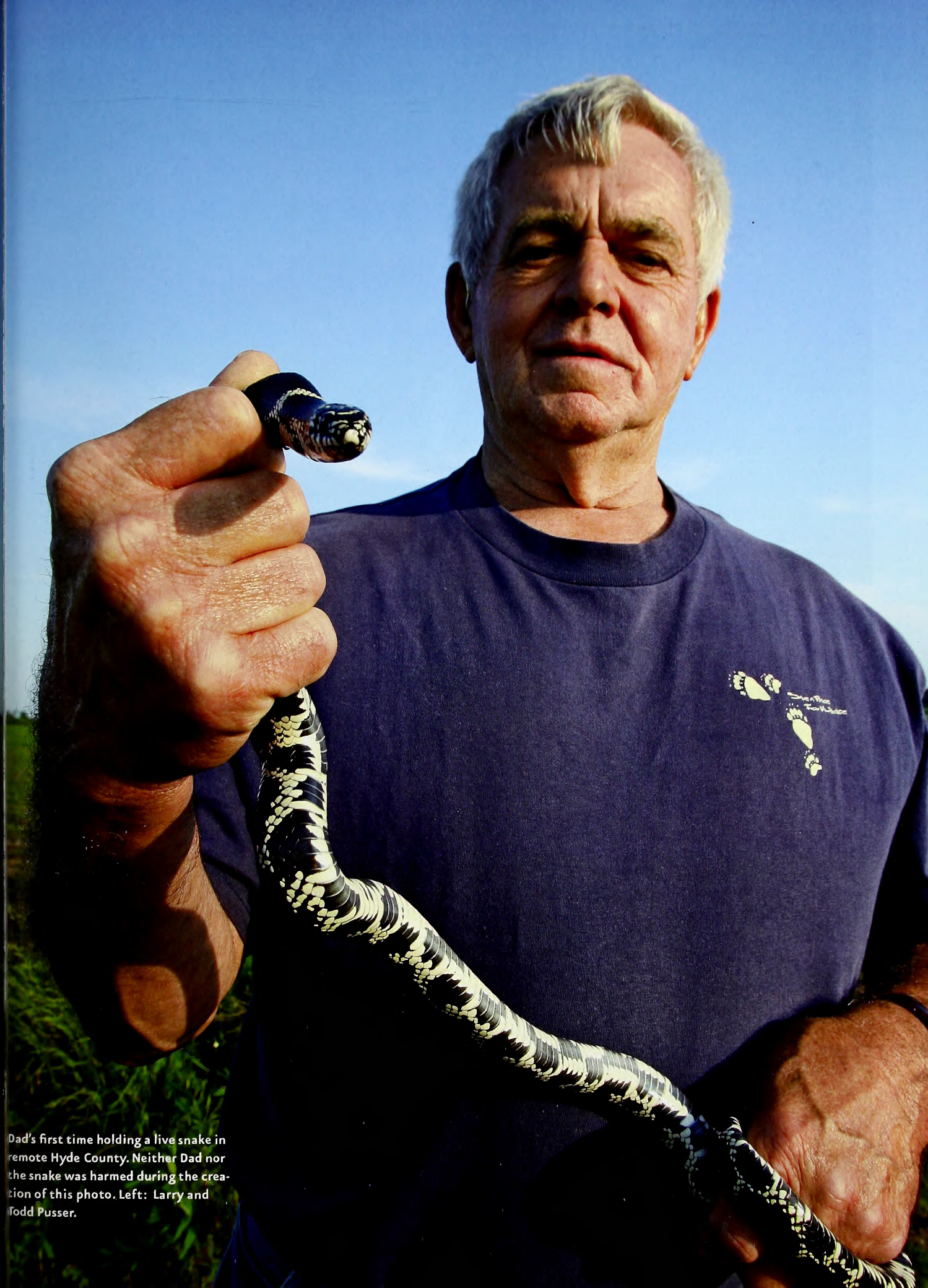
To Dad's dismay, in college I indulged my interest in all things cold and slithery and bought three snakes as pets. My parents' visits to my apartment outside of Chapel Hill were always entertaining, especially when a kingsnake got out of its aquarium and disappeared for several days, right in time for a visit from Mom and Dad. I have never seen Dad more uncomfortable, knowing that a snake was loose somewhere in the apartment—that is, until I posed the question on that lonely stretch of road in Hyde County.

I had asked my father to join me for a weeklong field trip to the Albemarle Peninsula in the Coastal Plain of northeastern North Carolina. This was our first trip together into the great outdoors since I was a teenager. We made visits to Pocosin Lakes National Wildlife Refuge, Lake Mattamuskeet, Alligator River National Wildlife Refuge and the Outer Banks. The purpose of the trip was to capture images of native wildlife for a book project I am working on and to spend some quality time with Dad enjoying the natural wonders our state has to offer. Now her
were in a friendly standoff.

The kingsnake remained still in my h
soaking up the warmth from my skin.
ahead and give it a try," I coaxed. "It w
bite." Dad still held his ground—old h
die hard. Smiling, I said, "Even if the s
bites, its teeth will barely break the ski
kinda like being scratched by briars."
comment failed to impress.

Dad had never held a live snake be
not even one of my pet snakes. When
work took me out of the country, Dad





Dad's first time holding a live snake in remote Hyde County. Neither Dad nor the snake was harmed during the creation of this photo. Left: Larry and Todd Pusser.

care of my snakes, very much against his will. Fortunately, snakes are low-maintenance pets, and Dad's care basically consisted of removing the lid from their aquariums and dropping a mouse inside once a week. If a snake's aquarium needed cleaning, Dad, wearing gloves up to his elbows, would corral the snake into a box with a coat hanger, close it up and perform his cleaning duties safely away from the business end of the serpent.

After several fruitless minutes of asking Dad to hold the kingsnake, I moved to the side of the road to let it go. Much to my surprise, he said, "OK, let me hold it." Glancing back at him, I asked, "Who are you and what did you do to my father?" Somehow, Dad had worked up enough nerve to hold a live, completely wild snake.

Not wanting to let this moment pass, I carefully handed the kingsnake over to him. I could see little beads of perspiration building on his forehead. Dad was genuinely nervous. But a funny thing happened. The kingsnake remained perfectly calm and Dad's expression changed from trepidation to joy. The snake wrapped around his arm and remained perfectly still. Dad gently touched its shiny scales, feeling the smooth musculature of the long body.

In that moment, Dad lost his fear of snakes. I quickly grabbed my camera to snap a few photos. I would need proof. Dad is a master storyteller and no doubt would recite the day's events to his friends and anyone else who would listen. I figured he would need a few photos to back up his claims as a professional snake charmer.

Dad keeps an eye out for bears crossing a long dirt road in Pocosin Lakes National Wildlife Refuge.

Early Influences

Larry Pusser was born in 1944 and has spent his entire life in the Sandhills of North Carolina. Even though a family carpet business took up most of his adult life, Dad still managed to find the time to hunt doves in the old fields near his home. When I came along, Dad took time out of his busy schedule to take me fishing. With Zebco 33s and plastic worms in hand, Dad and I would venture out most weekends in the spring and summer to try our luck in small farm ponds throughout the Sandhills. Among my most cherished childhood memories are Dad and I standing on a bank under the warmth of a Carolina sun, a gentle breeze blowing through the pines, and bobwhites calling in the distance.

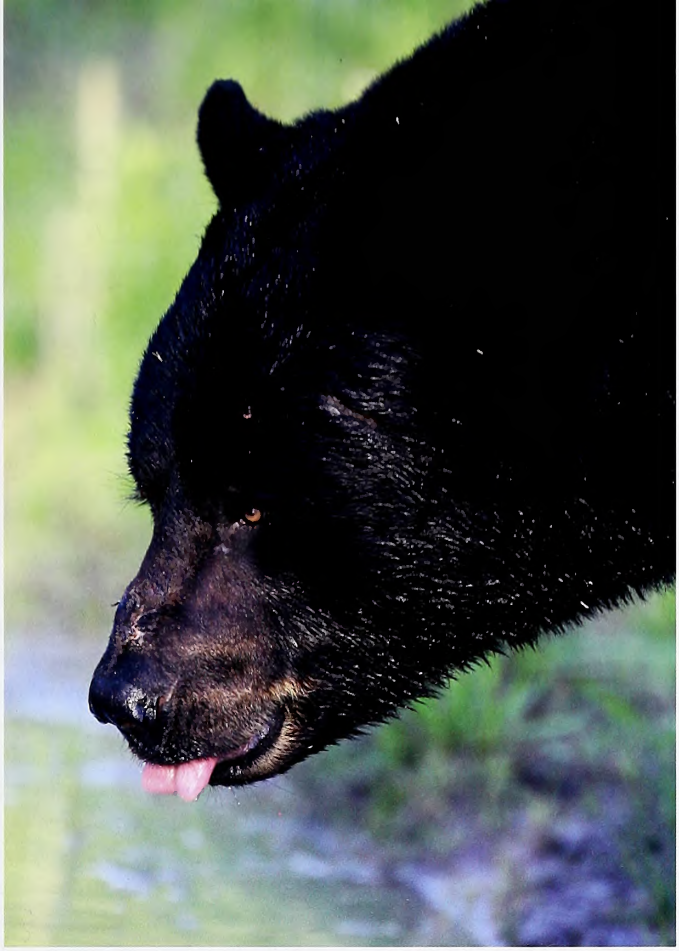
Another cherished memory is when we made our annual shopping trips to the mall in Greensboro during the Christmas holidays. I was not interested in seeing Santa Claus or looking for the best toy in the mall. Instead, I was fascinated with the red-tailed hawks that perched along U.S. 220 on our drive to Four Seasons Mall. Dad and I would compete to see who could spot the most hawks perched in the treetops along the four-lane highway. On one memorable trip to Greensboro we counted 36 hawks during the 70-mile drive.

These seemingly insignificant events left a huge impression on me and led me to pursue a career in marine biology and wildlife photography. As an adult, my travels often took me away from North Carolina for long periods of time. When I returned home, Dad always showed interest in my work, especially in the animals I encounter had the feeling that he was living vicar through my travels, and hearing stories adventures offered a much-needed dist tion from his day-to-day work.

Over the last few years, I have mad effort to spend more time in North Car traveling from the Mountains to the C Plain documenting our incredible nat heritage with camera and pen. Now th has retired, he has been able to join m number of these field trips.

Bobcats, Otters and Bears—Oh My

Aside from Dad's first snake-wrangli experience—Dad now insists that he give Crocodile Hunter Steve Irwin a ru his money if Irwin were alive today—



A pair of red-tailed hawks and a black bear drinking from a roadside mud puddle are just a few of the amazing wildlife encounters I have been able to share with Dad over the last few years.

Dad has overcome his irrational fear of snakes and no longer kills venomous species he encounters such as the cottonmouth (above) or the timber rattlesnake (far right). Below: Dad takes the plunge, snorkeling with a friendly manatee in Florida's Crystal River.

trip to the Albemarle Peninsula was filled with one highlight after another. Among them were waterways filled with river otters, a pair of bobcats walking down a long dirt road and bald eagles soaring high overhead. However, the Coastal Plain black bears left the biggest impression, figuratively and almost literally, on Dad.

Dad's previous experience with bears consisted mainly of watching documentaries on the Discovery Channel. Once with his brother-in-law, he saw a bear with cubs hightail it across a rural mountain road and disappear into a culvert. Aside from that fleeting glimpse, Dad had never observed black bears in the wild until our Coastal Plain trip. During that week, Dad and I observed more than 20 black bears in Pocosin Lakes and Alligator River national wildlife refuges.

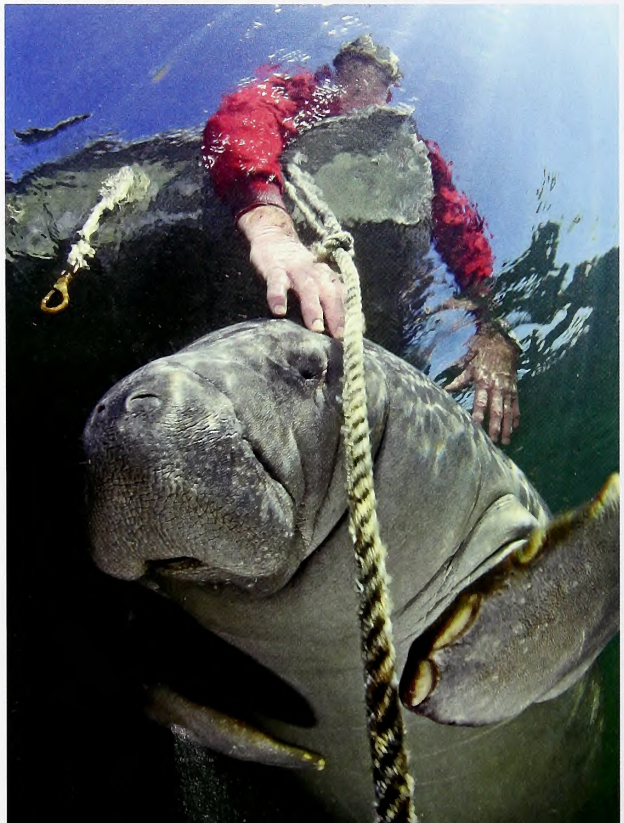
One particular encounter stood out from all the others. Dad and I were driving in the heart of Alligator River National Wildlife Refuge when we observed a huge bear up in the distance eating grass along the edge of a long dirt road. I turned off my truck's engine and we watched the bear quietly with binoculars from a half-mile away.

To say this bear was large is like asking if 100 pounds of flour makes a big biscuit. The Coastal Plain of North Carolina harbors the largest black bears in North America. The largest ever taken by a hunter weighed more than 880 pounds and was shot in 1998 just a few counties south of where we were sitt The bear in our binoculars was every bi 600 pounds, easily the size of grizzly bea have observed in Alaska.

Dad and I sat mesmerized as the bea started slowly walking in our direction opened the driver's side door and quie stepped outside with my telephoto len mounted on a tripod. Dad stayed in the The bear could easily see and smell us b continued to amble down the dirt road toward us.

As the bear approached, I circled arou the vehicle, keeping the truck between and the bear. Unfortunately, I forgot to c the driver's side door. Dad was still sitti in the truck when the bear passed by th open door just 10 feet away. The bear bri looked toward Dad, walked past the truc and began to drink water from a mud pu dle 20 yards away as I snapped photos. Eventually it moved off into the woods bordering the road, completely ignoring

I glanced over toward Dad, still sitti in the passenger seat with his hand firm wrapped around the door handle. He sm and remarked that he was going to let t bear have the truck if it had made a mo toward that open door. Being able to sh this exhilarating encounter with Dad a seeing the expression on his face filled n heart with joy. I began to ponder other t I could take with Dad and what wonder creatures we might encounter.



s Farther South

s Beidler Forest lies in the heart of the untry of South Carolina. Owned and ed by the Audubon Society, the forest rs the largest stand of old-growth bald ss left in the world. It is a mecca for e. Prothonotary warblers shine like jewels in the swamp, alligators bask on the tannin-stained water, and barred all at all hours of the day beneath the canopy. A mile-long boardwalk snakes through the swamp. It is a photogra- paradise.

h April, I make a trip to photograph est's abundance of natural wonders. In ring of 2008 I asked Dad to join me for le days of walking the boardwalk. It take much convincing, particularly I mentioned that we would eat at a won- barbeque buffet not far from the forest. ally wanted to photograph some of the s that inhabit this unique ecosystem. It take long before Dad spotted the first , a cottonmouth coiled quietly on a covered cypress log just a few feet off ardwalk. Before long we found another, en another.

t like counting hawks on our Christmas ing trips, Dad and I struck up a comp- to see who could spot the most snakes. 's end, my field notes show that we ed 23 snakes of five different species. I to note which one of us spotted the however—let's just call it a tie.

I took photos that day, but more often than not, I put my camera down and just took in the scenery with Dad by my side. We reminisced about times long ago, of all the snakes we encountered in our back yard, and Dad's irrational fear of them. I began to notice a change in Dad's opinion of snakes. Through our trips together, he was developing a deeper appreciation of wonders of the natural world, snakes and all. He was beginning to care.

Our latest trip together took us to Crystal River, Fla., a river that is dear to me. When I was a student at UNC-Chapel Hill, I made a trip to Crystal River with my scuba-diving class. We dove the freshwater springs and had amazing encounters with Florida manatees. Since that time, I have made the trip down to Crystal River every year to observe and photograph these gentle animals.

This past year, I asked Dad to join me. All of our past trips had focused on terrestrial habitats and animals. On this trip, I wanted Dad to experience some of the amazing wildlife found beneath the surface. Dad is not a certified scuba diver, nor does he like boats very much. He suffers from a degenerative ear condition which greatly affects his equilibrium on boats. In other words, he gets really seasick.

Fortunately, Crystal River is quite calm and far away from ocean swells. We rented a johnboat for the week and spent days out on the water observing ocean animals that travel up the river to the freshwater springs. Bottlenose dolphins, tarpons, gray snappers and, of course, manatees were common in the river. I even managed to convince Dad to put on a wetsuit and get in the water to snorkel with the manatees—something I am sure he never imagined doing. Despite unusually cold weather, Dad and I had a wonderful time together on the river. I managed to get some good photos, including one of my all-time favorite photographs: Dad suited up in snorkel gear, resting on the surface of the river and reaching out to touch a curious manatee.

Like Son, Like Father

My field trips with Dad over the last few years have been among my most enjoyable times spent in the field. Even though we did not spend a lot of time outdoors when I was a kid, Dad helped spark a lifelong interest and passion for the outdoors through our fishing excursions together. He certainly made trips to the mall more interesting.

More than that, Dad taught me to always set goals for myself and always supported me when I made crazy statements as a kid, saying I wanted to be a marine biologist. To be able to return the favor as an adult has been a wonderful privilege for me. To see Dad develop a deeper appreciation for our native wildlife here in North Carolina and elsewhere is incredibly rewarding.

Not long ago, Mom called and told me something I never thought would happen in a million years. Driving down a country road near Jackson Springs, Mom and Dad encountered a timber rattlesnake in the center lane. Dad immediately pulled off the shoulder of the road and jumped out of the car to stop oncoming traffic. He broke off a small tree limb and coaxed the venomous reptile off the road and safely into the woods. This surprised both Mom and the other drivers. Dad went on to explain how the serpent plays a crucial role in the health and well-being of our environment. Killing it would be unjustified.

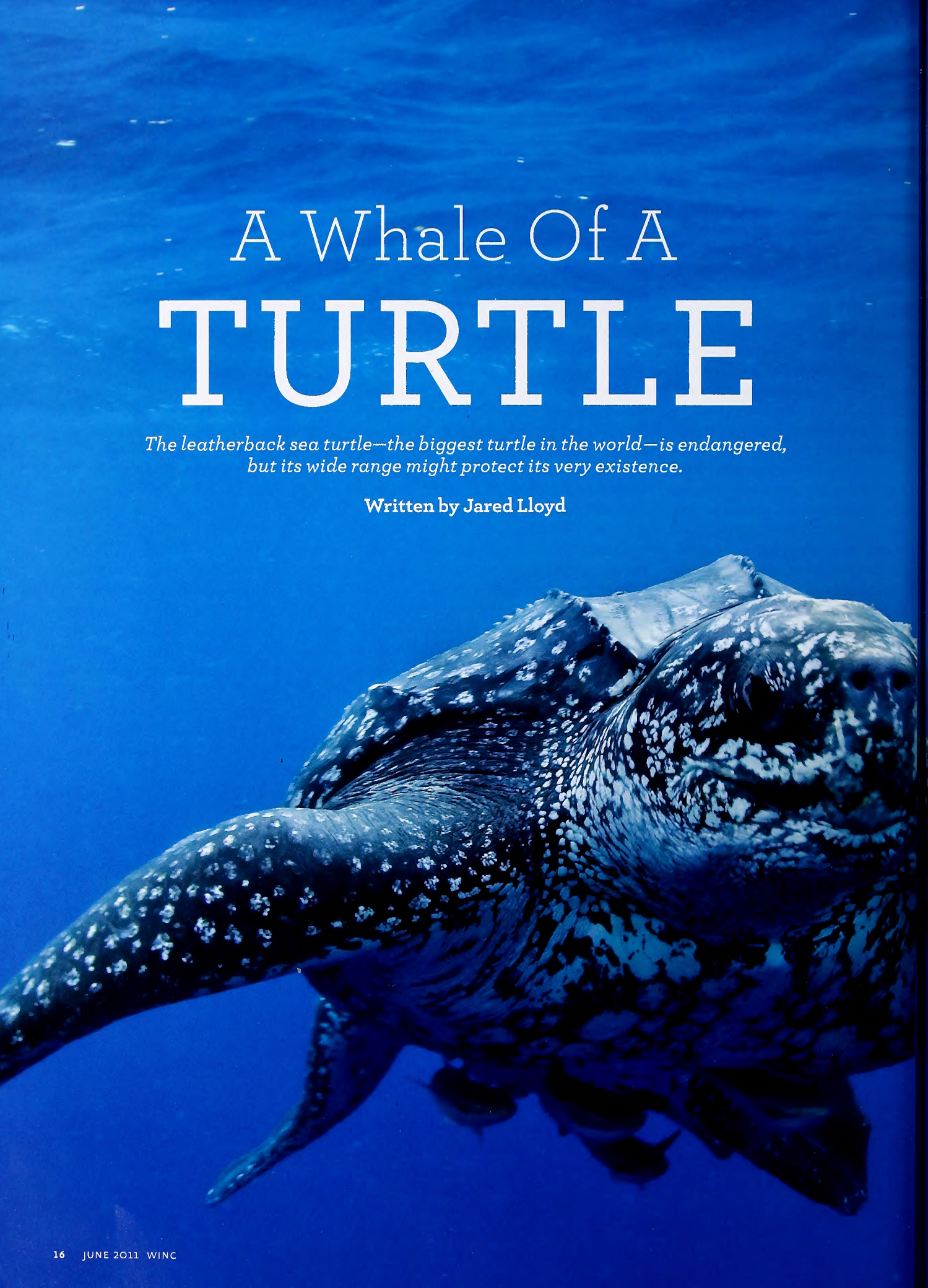
Dad, I am proud of you. ◆

Todd Pusser is a regular contributor to WINC. *To see more of his photography, please visit www.toddpusser.com.*

A Whale Of A TURTLE

The leatherback sea turtle—the biggest turtle in the world—is endangered, but its wide range might protect its very existence.

Written by Jared Lloyd



On the night of June 18, 2009, a dinosaur was sighted in Kill Devil Hills. The moon was in the third quarter and the tide was flooding as the largest species of turtle on Earth hauled itself out of the Atlantic Ocean and began its arduous journey across the beach. Instincts nearly as old as life itself pulled it further and further into the alien world of terra firma. This was the farthest north a leatherback sea turtle had ever been recorded to nest in the Atlantic.

The beaches of the Outer Banks are no strangers to nesting sea turtles. In the spring and early summer, the reptiles' telltale tracks can be a regular sighting in places such as Pea Island National Wildlife Refuge and the rest of Hatteras Island. To the untrained eye, these "turtle crawls" look as if an 8-year-old boy tried to drag himself up the beach while lying on his boogie board. But each crawl, identifiable by both size and pattern of strokes made as the turtle laboriously drags itself across the sand with flippers, can be used to determine the previous night's visitors. It was a crawl that first tipped off Christian Legner of the N.C. Aquariums and Karen Clark of the N.C. Wildlife Resources Commission that they were dealing with something special.

The loggerhead sea turtle (*Caretta caretta*), the most common turtle to nest on the beaches of North Carolina, leaves something of a zigzag pattern in the sand. As this creature swims with a sort of freestyle action of Olympic swimmers, pulling itself along one flipper at a time, the characteristic track is easily identifiable. The green turtle (*Chelonia mydas*), on the other hand, does something more like a breaststroke. Its crawl has parallel flipper marks, with the drag from the plastron interspersed with a rhythmic drag of the tail. For the leatherback (*Dermochelys coriacea*), however, let's just say it looks like someone rolled a giant monster truck tire up the beach.

To say that the leatherback is big just does not do it justice. Imagine a turtle that can grow to a length of 7 feet, have a flipper span of 9 feet and weigh more than 1,000 pounds. This gives the leatherback the distinction of being the world's largest turtle. (By comparison, the Galapagos tortoise reaches a little more than 4 feet and 600 pounds.) Yet the uniqueness of this turtle does not end at the length of its leathery shell. Pretty much everything about this creature puts it into a class (or should I say a genus) all by itself.

For starters, the leatherback doesn't have a shell like other turtles, hence its name. Instead of a hard carapace, its "shell," if you will, is actually a leathery tissue that overlies the dermal bones beneath. Considering that leatherback sea turtles have been known to dive to depths greater than 3,900 feet—deeper even than most whales—the somewhat soft and pliable shell may be an adaption to prevent being crushed from the 1,800 pounds per square inch of pressure at such depths of the abyss.

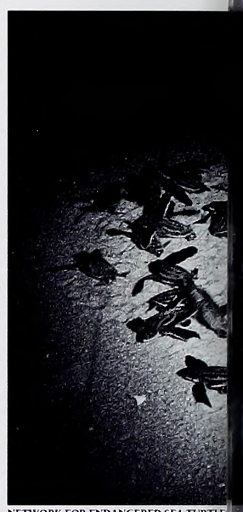
In order for the leatherback to plummet so far into the darkness of the ocean deep, it has developed an ingenious way of handling oxygen in its body. Common sense would say that the more oxygen needed, the bigger the lungs, right? But the leatherback's lungs actually collapse at a mere 300 feet. The leatherback holds more oxygen in its blood and tissue than in its lungs. To do this, the turtle has the highest red blood cell density of any reptile. As its lungs collapse, which helps free the turtle from buoyancy, its body stores the oxygen in its blood to be used during diving. To increase the efficiency of this process, the leatherback can slow its heart rate to around one beat a minute.

MICHAEL PATRICK O'NEILL/OCEANWIDEIMAGES.COM

The leatherback sea turtle species is roughly 100 million years old, making humans look like mere infants. It has witnessed changes on this planet that we can barely even begin to wrap our minds around. It has adapted and survived.

MATTHEW GODFREY/NCWRC

NETWORK FOR ENDANGERED SEA TURTLES



NETWORK FOR ENDANGERED SEA TURTLE

Leatherbacks drag themselves onto the beach to nest, leaving tracks that resemble a large tractor tire. When the eggs hatch, hatchlings "boil" out of the nest and head for the sea. Hatchlings have been documented on the Outer Banks several times in the past decade.

Now to really stretch the limits of believability and the imagination, leatherbacks have been documented swimming around icebergs in Alaska, Norway and well above the Arctic Circle. As marine biologist Carl Safina discovered, there have even been soapstone carvings of leatherbacks found on Baffin Island (between Greenland and Hudson Bay). It's not that reptiles don't live in places like this, it's that they simply can't — except for the leatherback.

The thermoregulation capability of the leatherback (its ability to regulate its own body temperature) completely turns everything we thought we knew about reptiles on its head. Reptiles are ectotherms, meaning they regulate their body temps from the surrounding environment. Yet here we have an endothermic sea turtle, regulating its own body temperature from within like a mammal. In fact, the leatherback can maintain an internal body temperature between 77 and 84 degrees Fahrenheit even in water as cold as 41 degrees. This immediately raises two questions: how and why?

The ability of the leatherback to thermoregulate is multifaceted. First off, this turtle is huge. The bigger the body, the more insulated the internal organs are due to the ratio of volume to surface area, and the slower the metabolism. This aspect of its physiology is called gigantothermy and allows the leatherback one of the widest distributions of any animal on Earth, rivaled only by the great whales such as the blue, gray and humpback.

Second, the leatherback not only conserves heat, it also generates it. To accomplish such a feat, this turtle has both an outer insulating layer of blubber like marine mammals and a layer of brown fat networked with blood vessels. This brown fat is unique in that it actually produces heat. Reptiles, the very definition of cold-bloodedness, aren't supposed to have physical adaptations like this.

Third, the leatherback's circulatory system is highly specialized for dealing with temperatures that would stun and kill any other reptile. Like a mammal, this sea turtle has the ability to shunt warm blood away from its outer extremities and conserve it where it counts the most — around the organs. The leatherback sea turtle also has a unique [illegible] of countercurrent heat exchanger in [illegible] its front flippers to keep heat in the [illegible] cold out on the flippers, which are the [illegible] nest part of the body and therefore the [illegible] way for it to lose heat.

Even the chemical reactions that occ[illegible] the leatherback's muscles are designed f[illegible] cold. When your fingers get cold, your h[illegible] get stiff and clumsy because the chem[illegible] reactions in your muscles are not as eff[illegible] at lower temperatures. The rate of meta[illegible] reaction in the leatherback's muscle [illegible] remains constant, however, even in ten[illegible] ature swings of 40 to 100 degrees Fahre[illegible] This means that this sea turtle could sw[illegible] right out of tropical waters into the ar[illegible] and its swimming muscles would conti[illegible] to work the same.

All of this brings us back to the ques[illegible] of why. Why would a leatherback deve[illegible] these cold-water characteristics? Most [illegible] this has everything to do with migrati[illegible] which, as is the case for all animals, h[illegible]

NATURE'S WAYS

How Do Leatherback Sea Turtles Maintain Their Body Temperature?

See Nature's Ways, page 39.

WWW.BRANDONCOLE.COM

thing to do with either food or sex. This ern-day, highly specialized dinosaur has ed in such a way that it can exploit both e feeding grounds in the colder waters e north and prime breeding grounds for urtles in the tropics—an ecological e tapped by few.

eally, it's the best of both worlds for the erback. The frigid waters off the coast va Scotia and the Grand Banks are far biologically productive than the rel- ly nutrient-poor warm waters of the tro- Having the size and the ability to make nsoceanic migration like this puts the erback into the same category, again, whales such as the humpback, which ds the summer gorging itself in the cold- r buffets of the northern Atlantic, only grate south to the subtropics to breed in winter. It's this notion of breeding that ately brings us back to Kitty Hawk.

1966 there was an unconfirmed report atherback hatchlings on the beach of n Core Banks in Cape Lookout National ore. The report might not have been taken seriously, considering that the farthest north leatherback nesting had ever been recorded prior to that was in Florida. However, when two leatherback nests on Cape Hatteras National Seashore were discovered in 1998, the textbooks had to be rewritten. Many people thought this was a fluke, an accident, certainly nothing to come to expect in the future. Yet in 2000 it happened again, then again in 2002. Year after year the number of nests continued to increase. Although loggerhead sea turtle nest counts have suffered an annual 1.3-percent decline since 1983 (nearly a 40 percent drop), the leatherback's nesting success continues to grow.

It is estimated that the world's oceans have 15 to 20 times as much heat entering them as the atmosphere does. Oceans are giant thermal masses in this sense, and many argue that they provide a much more reliable indicator of things such as climate change than air temperatures do. It is therefore interesting to note that the year the first two confirmed leatherback nests were found in North Carolina was also the hottest year ever recorded up to that time. Of course, this simply could be a coincidence. However, considering that there were no known leatherback nests north of Florida until the early 1980s, and that the northern limit to nesting has continued to expand ever since, climate change and the subsequent increase of ocean temperatures cannot be ruled out as a possible cause.

The leatherback sea turtle species is roughly 100 million years old, making humans look like mere infants. It has witnessed changes on this planet that we can barely even begin to wrap our minds around. It has adapted and survived. Some biologists argue that its unique ability to thermoregulate quite possibly was an adaptation to the ice ages, freeing it from the shackles of competition within those ecological niches typically afforded sea turtles. As waters cooled and air temperatures plummeted, reptiles were confined to areas in the tropics with finite resources for which competition was fierce. The leatherback, on the other hand, evolutionarily joined the likes of the great whales and pushed north into waters uncharted by reptiles to exploit the bountiful resources of the subarctic ocean. The leatherback is nothing if it is not adaptable.

It is the leatherback's great range that puts it in contact with direct and indirect harm from humans. Many trawl-fishing nets in the United States have been fitted with turtle excluder devices, but commercial bycatch is still a problem in some fisheries. In many parts of the world, people harvest turtle eggs from the leatherback's nesting beaches. Another threat is pollution, manifest in the form of chemicals and in trash such as plastic bags that resemble a favorite leatherback prey, jellyfish.

Only time will tell why this giant of the sea has become an annual visitor to the windswept beaches of our barrier islands. Or, it is entirely possible that we may never know what has driven it north in its pursuit of nesting habitat. Either way, the leatherback sea turtle has become a welcome and anticipated part of the litany of species that choose to use the Outer Banks for the continuity of its species. ◆

Jared Lloyd, a naturalist and photographer living in Kitty Hawk, is an occasional contributor to WINC.

PART THREE OF A THREE-PART SERIES

FISH BY THE MILLIONS

Today's hatcheries give a nod to the past, but step straight forward into the future of fish culture and management.

WRITTEN BY JIM WILSON ILLUSTRATED BY TIM LEE

"It goes without saying that a fish hatchery has little excuse for being unless it is making a contribution to the sport of angling."

– Willis King,
N.C. Division of Game and Inland Fisheries, 1947

Although the artificial propagation of fish dates back to 1877 in North Carolina, the rise of the modern hatchery system began nearly 50 years later in 1925 when the N.C. General Assembly appropriated $500,000 to build new hatcheries across the state, with five locations in Waynesville, Marion, Boone, Roaring Gap and Fayetteville.

That lineup proved anything but static. The state leased the Marmon Hatchery in Pineola in the early 1940s and later bought that facility. It also ran the Weldon Hatchery on the Roanoke River for the production of striped bass, and by 1948, less than one year after the N.C. Wildlife Resources Commission was formed, began production at Table Rock Hatchery near Morganton.

Of the original five locations, only Marion, a coldwater facility, remains in the system. The current lineup consists of Table Rock, the lone coolwater hatchery; the Setzer Hatchery near Brevard and Armstrong Hatchery near Marion, both coldwater facilities; and warmwater hatcheries McKinney Lake in Richmond County and Watha Hatchery in Pender County.

Yet despite an interval of 125 years, at its heart the artificial propagation of fish has changed little since Stephen G. Worth, the superintendent of North Carolina's first fish commission, and his workers set out to grow fish to release in waterways all across the state.

The reasons for growing fish are different, the methods are much improved and the role of hatcheries within the Wildlife Commission has changed and continues to evolve, but the basics are still the same.

"The process hasn't changed very much," said David Deaton, fish production supervisor for the commission's hatcheries. "The concepts are pretty simple. You have to fertilize the egg and then maintain specific biological requirements for that particular species for successful reproduction. Our ability to identify and understand the biological requirements has increased over the years. By incorporating sound scientific principles and methods into the 'art of fish culture,' we have been able to produce a wide variety of species successfully and efficiently.

"People sometimes even still use turkey feathers to mix the eggs and sperm, which is the old way of doing it. Your finger works just as well. A lot of the old ways, or parts of them, are still carried on today."

Of all the fish cultured in the United States, probably none has received more attention than the various species and subspecies of trout. As far back as 1892, William P. Seal, aquarist at Woods Hole, Mass., described trout culture as "the nursery, the kindergarten, and college of fish culture."

Deaton described trout production as "in some ways, like following a cookbook. Trout have been produced for years so the basic ingredients and methods have been identified and put into practice. However, not all hatcheries are the same and production goals change to adapt to fishery management needs. For example the big shift we have made is the production of triploid trout."

Triploidization, the process by which a trout ends up with three sets of chromosomes instead of two, actually can occur in nature. A female trout's eggs possess two sets of chromosomes, the male's sperm have one set. After the eggs are fertilized, the chromosomes recombine, leaving the egg with one set of chromosomes from the female and the one from the male. The third set is rejected from the egg. Occasionally that fails to happen, and the egg is left with three sets of chromosomes, leaving the fish sterile. In all other aspects, the fish acts the same as other members of its species.

Fish biologists discovered that by either introducing the eggs to warm water or applying pressure to them, they could artificially duplicate triploidization. All of the trout stocked by the Wildlife Commission since 2007 are triploids. In 2010, more than 850,000 trout were released in the Mountains. Commission biologists use the pressure shock method for rainbows, brook trout and brown trout. This method has been found to be the most consistent and effective method to induce triploidy.

After trout eggs are collected and fertilized at the hatchery, they are placed inside a stainless-steel hydrostatic pressure chamber. Brook trout and rainbow trout eggs are under a pressure of 9,500 pounds per square inch (PSI) for five minutes; brown trout get 10,000 PSI for six minutes. The eggs are then triploid and sterile.

When the Division of Inland Fisheries decided to stock triploids, hatchery workers studied the available literature on the subject, then began testing. "We took the recipes from various published studies and compared or adjusted them," Deaton said. "We did multiple replicates of small batches with different recipes. We wanted the recipe that would produce the highest percentage of triploids, and had the greatest hatch and survival up to the first feed — 100 percent triploidy means nothing if survival is poor and the fish don't grow."

"People sometimes even still use turkey feathers to mix the eggs and sperm, which is the old way of doing it. Your finger works just as well. A lot of the old ways, or parts of them, are still carried on today."

The reason for stocking triploids primarily was to preserve the genetics of the North Carolina's only native salmonid, Southern Appalachian strain brook tr "Although we do not stock in waters native brook trout populations, we do want northern strain brook trout from hatchery to have the opportunity to mi native brook trout," Deaton said.

Other advances in technology have fited fish production among all speci the commission grows. "As technolog evolved, we are now ab manipulate water temp tures, better monitor w quality, and utilize var chemicals to treat sick or aid in spawning.," D said. "There are hormo can inject fish with to s chronize the spawning process, such a pituitary for muskies. Technology has us a more efficient way to produce fish

A better understanding of fish them has aided production, also. For examp North Carolina's first fish commission gled to produce and grow striped bass

lbemarle Sound, Worth once stripped
ggs from a female striped bass but did
ave enough milt from males to fertilize
ıst container of eggs. He took several
rican shad bucks and squeezed sperm
them, mixed with sound water, onto the
d bass eggs. The combination bore little
a 6-percent fertilization rate, and that
because there must have been striped
sperm in the sound water.
ologists now know that part of the pro-
with striper fertilization is that simply
ıse a female is ripe with eggs does not
those eggs are ready for fertilization.
hey were pulling fish right off the river,
rious stages of development," Deaton
f the 19th century efforts. "Our under-
ing of striped bass egg development has
ed over time, and we know that there is
rt time frame when those eggs can be
ned successfully. We observe spawning
ior in the tanks, and Jeff [Evans, Watha
intendent] will take a sample of eggs
each female and look at them under a
oscope. The samples can be compared
tures of eggs in various stages of devel-
nt and a precise time for when each
e should be spawned successfully can
dicted. There's a short window of time
ripe eggs can be successfully fertilized
e sperm to become viable eggs."
ıe other major change in hatchery oper-
s that has allowed better production and
val is the advent of commercial diets for
The technology involved in feeding now
tty extensive," Deaton said. "Fish need
and they need food. Back then they fed
they had available. Today, we can pur-
feeds for all life stages of most fish. These
are nutritionally balanced and efficiently
fish with little waste. This results in
oved growth and better water quality.
wasn't even all that many years ago
ısh were fed a diet of scrap meat, leav-
foul mess at the bottom of ponds or
ays. Some hatcheries even suspended
eads of cattle over the water to attract
The flies laid eggs that produced mag-
which fell into the water to feed fish. At
trong Hatchery, the doors to the feed
obviously are those of a meat locker.
still have moist diet recipes in my
Deaton said. "That was one guy's job.
come in the morning and start grind-
eat. They'd take so many pounds of
so many livers, so many hearts, run it
gh the grinder to a certain size.

They'd add bags of fish meal and make a paste or chunks out of it."

These days feed is composed primarily of fish meal, fish oil and vegetable material.

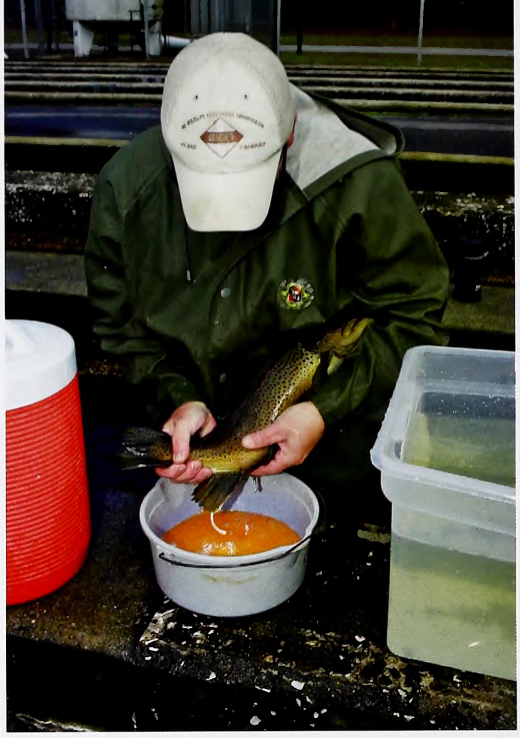
The commission's hatchery program is crucial to the Division of Inland Fisheries, affecting any number of programs, from trout and muskies to striped bass, American shad, channel catfish and numerous other species. The warmwater hatcheries provide all the catfish for the agency's Community Fishing Program. Last year that total approached 180,000 catchable catfish. The warmwater facilities in 2010 also produced 4.1 million American shad fry and 1.2 million striped bass of two sizes.

All told, the hatcheries produced 5.7 million fish last year, plus another 850,000 brook, rainbow and brown trout.

And to what end are those fish grown and released? In the 19th century, the focus of North Carolina's fish commission was entirely on food fish. Recreational fishing was not

PHOTOGRAPHS BY MELISSA McGAW/NCWRC

(Clockwise from top left) Matthew Turpin (left) and Landon Beaver weigh channel catfish fingerlings. The fish are carefully counted prior to transfer. Barry Midgette pours a bucket of catfish into a hatchery truck. David Deaton, fish production supervisor for the commission, cleans mussels at the Marion Hatchery.



PHOTOGRAPHS BY MELISSA McGAW/NCWRC

considered. The goal was to bring fish to the people. The commission stocked millions of American shad, an important food fish at the time, and also introduced common carp to the state. The thinking was that carp would become an important food fish.

Today, much of the work of the Wildlife Commission's hatcheries involves sport fish, although the agency has begun growing some endangered and threatened mussel species, an endangered fish — the spotfin chub — and the magnificent ramshorn snail. Even though various species of fish may be designated as sport fish, there are different reasons for culturing them.

American shad, stocked as fry, are part of an effort to help restore the species, whose populations have been in a long decline. Shad stocking has been ongoing in North Carolina since the 1870s, and was a major effort by that first state fish commission and the U.S. Fish Commission, which stocked hundreds of millions of them as fry in the Albemarle Sound.

Channel catfish, on the other hand, are intended to be caught, as are all the trout. And that brings up a longstanding misconception about the hatchery program in general and trout in particular.

"By far the biggest misconception about the trout stocking program is that it is to establish or restore populations of trout," said Doug Besler, coldwater research coordinator for the commission. "In the '80s we made a pretty clear distinction when we started our new trout management plan[n] said that if that a stream had wild, repro[d]ing trout species in it, whether they be [r]bow, brook or brown, then we shouldn't[e] stocking those streams at all. We woul[d] leave such populations to be wild, and t[o] are in and of themselves unique resour[ce]

"We decided we should put our stoc[k] efforts into those locations that either co[uld] sustain a year-round fishery either bec[ause] the water temperature got too warm o[r] habitat, through sediment or some ot[her] human-induced impact, made it impos[sible] for the stream to support trout year-ro[und] We don't add streams to our stocking [pro]gram that have a wild trout population[.] That misperception has persisted."

What anglers need to understand, B[esler] said, is that wild populations of fish are [much] more resilient than people give them c[redit] for. As an example, he cited a devastati[ng] flood that occurred in Curtis Creek.

"It was amazing how much debris m[oved] through that creek," Besler said. "There were oak logs 30 feet up in trees. The c[reek] was scoured to bedrock and rubble. Yo[u] would look at that stream and say there['s] nothing alive in there. We were up there [two] weeks after and found rainbow trout ad[ults] Not many of them, but you would find[a] adult rainbow trout sitting in an area t[hat] had been blasted out. It was amazing th[at] animals had survived that sort of turbul[ence] The next spawning class, you could tel[l no] difference in the creek if you didn't kn[ow]."

The commission's hatcheries are jus[t as] important in other regions of the state[s] they are in the Mountains. "The hatcher[ies] play an integral role in how we do busi[ness] here on the coast," said Kevin Dockendo[rf], the commission's coastal research coor[di]nator. "That role will become even greate[r] the next decade as we get more and m[ore] into genetic analysis of fish."

Genetic analysis, which can be acc[om]plished merely by clipping a piece of a [fin] for study, might replace the current m[ark]ing method of using oxytetracycline (O[TC], a common antibiotic, to stain a fish's o[to]lith, a bone located in the ear. This markin[g] allows biologist to determine hatchery [or] wild origins of fish. And while Docken[dorf] said that both methods have their lim[it]ations, genetic analysis does have a dis[tinct] advantage. "When we capture fish to ch[eck] the OTC marking, we have to sacrifice [the] animal to study the otolith. Its use is o[ver]

oint. We have to grind the otoliths to
l the OTC marking. We don't have to
ice the fish with genetic analysis."
the Coastal Plain, the commission is
ning to stock rivers with fish specific
t waterway. It is thought that the gen-
daptations in specific populations of
vill allow those stocked fish to better
ve and grow in the wild. For example,
ear the commission, and the Edenton
nal Fish Hatchery, stocked striped bass
e Cape Fear River grown from brood
aken from that river and only that river.
11, American shad stocked into the
oke River system have come only from
of Roanoke origins.
or years we used striped bass brood
aken from the Roanoke River,"
endorf said. "And that's probably OK
servoirs that receive an annual sup-
ental stocking. Looking at the genetic
is, however, there might be enough
ences between the Cape Fear and the
oke to make a difference."
verall, the hatchery system is operating
to its maximum production, but
endorf said the workers at those facil-
often find ways to tweak production
ut increasing spending. "Hatcheries
's look for better ways to produce the
fish they can from the brood stock
eceive," he said. "They look for ways to
nize costs. For a long time, we used hor-
s to make shad spawn at varying water
eratures. But we found if you maintain
ater temperature, you don't need the
ones. We've had American shad spawn
days with no enhancement.
hese guys at the hatcheries, they're
nazing group of individuals who can
all these animals for our mission. We
a great system, and working here on
past, I can't speak more highly of the
a Hatchery."
short, the hatchery functions as a
gement tool for the Division of Inland
ries, whether it is to provide angling
tunities, help restore endangered species
p supplement dwindling populations
h such as American shad. "Wherever
s a need to grow aquatic animals, that's
the hatcheries come into play,"
n said.

Wilson is associate editor of Wildlife
rth Carolina. *He may be reached at*
ilson@ncwildlife.org.

A TROUT HATCHERY AND THE INDY 500

The Marmon Fish Hatchery at Pineola in Avery County is little more than a fading memory now. A number of folks can point out where it used to be, but its bones are gone, lost in the shuffle of time and people.

In its day, however, the hatchery was considered technologically cutting edge, especially for a privately built facility in a tiny Mountain town. And that's exactly what you might expect, given that the facility was built by a mechanical engineer and pioneer luxury automobile manufacturer who designed the race car that won the first Indianapolis 500 in 1911. Howard C. Marmon's triumphant car, the Wasp, named for its pointed rear end and bright yellow color, averaged 74.6 miles an hour in the race that took 6 hours and 42 minutes to run.

Marmon, of Richmond, Ind., developed a love for western North Carolina as a child when he spent summers in Linville with his parents in the late 1800s. Upon his retirement, he and his wife returned to the mountains and built an estate, Hemlock Hedges, in Pineola near the site of the present-day Linville Land Harbor. Marmon apparently was creating an idyllic life there. In addition to the main house, Marmon constructed a servants' house, a nursery to provide plants for his estate and the hatchery to supplement existing trout populations. He also constructed a dam on the Linville River at Pineola to form a small lake.

A story in the October 1943 edition of *Wildlife in North Carolina* announcing the leasing of the facility by the Division of Game and Inland Fisheries described the hatchery as being "unique in character. There are six long raceways averaging about twelve feet in width and as much as two hundred feet in length for holding trout fingerlings."

Each raceway had one concrete side, but the other side and the bottom were earthen, which was thought to be the best way to grow normal-colored trout in a hatchery.

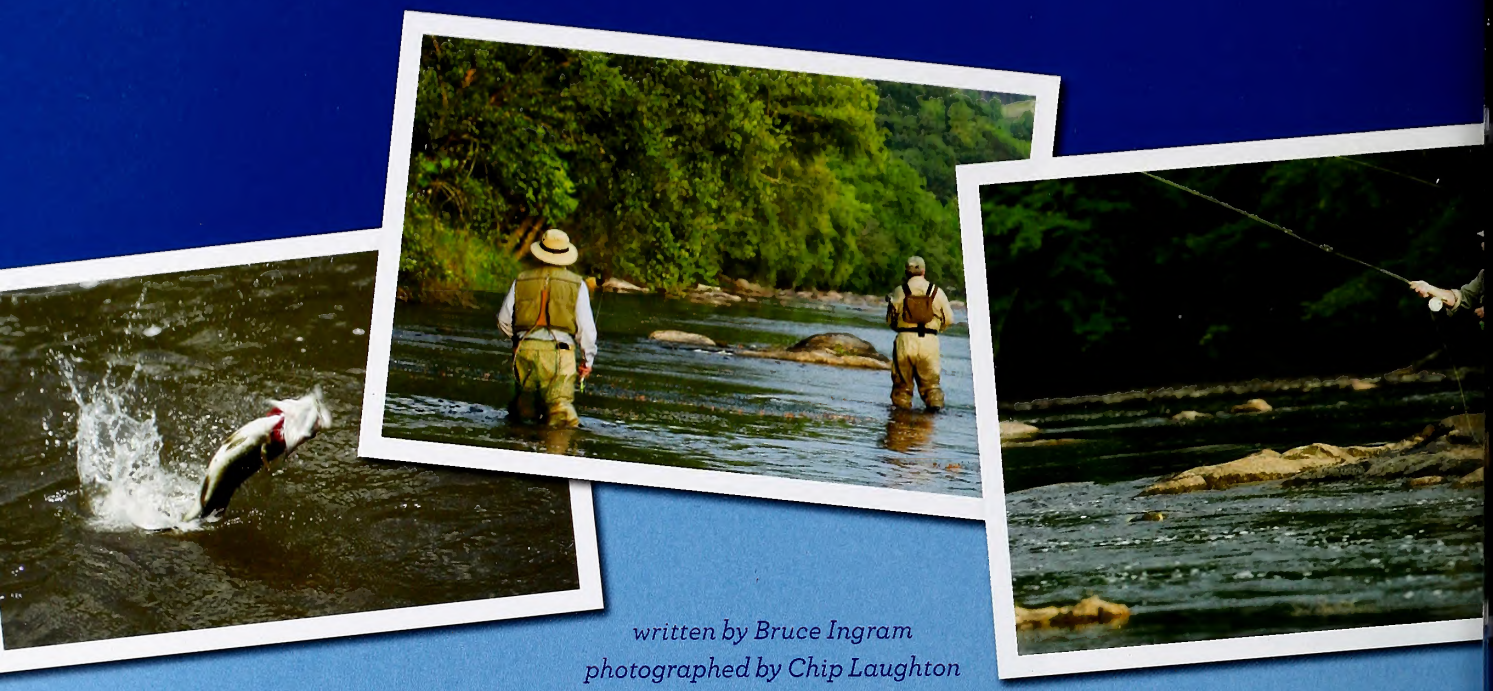
The state had sold its hatchery at Boone in 1943, and replaced it by leasing the Pineola hatchery after Marmon's death the same year.

By 1947, when the modern Wildlife Commission was formed and subsequently purchased the Marmon Hatchery and 243 acres east of U.S. 221, the facility was producing almost 27,000 trout each year, at first primarily brown trout for stocking in the Linville and Elk rivers. The hatchery obtained water from a couple of sources, including Avery Creek, and could pump water into the raceways from either end. Its water was too cold in the winter for hatching trout, but was ideal the remainder of the year, which was the opposite situation from the Marion Hatchery. Thus the two facilities worked in combination, with Marion hatching the eggs and Marmon taking over the growing out of the fish to 7 inches in length.

That arrangement worked well until the mid-1960s when the commission decided to combine the work of the two hatcheries at the Marion facility.

The Marmon estate served as the Moose Club lodge for a number of years, but now stands empty and crumbling. But a vanished hatchery and decaying manor home are not the final legacy of Marmon. During his lifetime, he contributed much of the money used to build the little Presbyterian Church in Pineola, and his heir, Robert Morrison, upon his death, left funds to establish the Morrison Library in Newland, and trust funds to Garrett Memorial Hospital in Crossnore and Cannon Memorial Hospital in Banner Elk.

(Clockwise from top left) Fisheries technician Greg Dietzler puts male brown trout in a stunning solution prior to stripping milt from the fish. Gary Gouge releases some of the hatchery trout into an Ashe County stream. Trout eggs are poured into a hydrostatic pressure chamber where pressure will render the fertilized eggs sterile.



written by Bruce Ingram
photographed by Chip Laughton

Blue Ribbon Stream

Native Americans dubbed the Nolichucky the "river of death" for the Class IV rapids that pock the waterway's gorge along the North Carolina and Tennessee state line. Considered sacred by the Cherokees, who believed that both spirits and monsters haunted its depths, the river allegedly had devoured entire hunting parties. But today this stream, which originates in the mountains of western Carolina, should simply be called one of the state's blue-ribbon destinations for fishermen, canoeists, birdwatchers and other nature lovers.

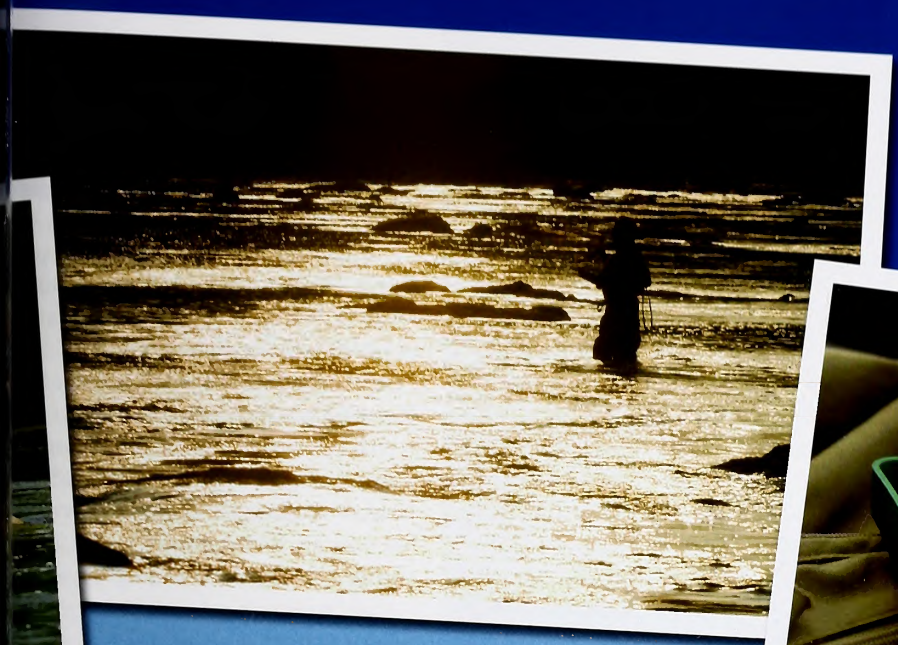
Jacob Rash, a fisheries biologist and coldwater research coordinator for the N.C. Wildlife Resources Commission, rates the stream highly. "I think that the Nolichucky River is one of the more scenic fisheries that we have in North Carolina," he says. "Along with the natural beauty, you will find excellent smallmouth bass and muskellunge fisheries. To be honest, our information on the smallmouth bass population is limited; we are actually beginning a multiple-year survey of the smallmouth bass populations in North Carolina, so I will be able to comment more on the Nolichucky's population in the future.

"However, I do know that it is a very popular fishery; multiple anglers and recreational guides target the river. We currently stock 70 muskellunge fingerlings (8 to 14 inches long) each year from the Penland bridge [on the North Toe River] to Poplar to sustain the fishery. In addition, many recreational paddlers frequent the gorge section; plus, there is a large guide business for that as well."

Kevin Howell, who operates Davidson River Outfitters in Pisgah Forest, is similarly enthusiastic about a waterway local folks call "The Chucky."

"I think it's one of the top two rivers in the state for smallmouths, the other being the French Broad," proclaims Howell. "The Nolichucky contains good concentrations of smallmouths and outstanding shallow-water habitat. During the summertime, fly and spin fishermen who like to use surface patterns and lures will really enjoy working smallmouths that hold in that cover."

Howell relates that the cover comes in the form of rock ledges, washed-out sandbars, water willow beds and dropoffs behind them, blowdowns along the bank, and the usual assortment of eddies, pocket water and



The Nolichucky offers exceptional smallmouth fishing for fly-anglers who target areas within or near the main river channel.

An expedition on the Nolichucky River offers your choice of great fishing, whitewater paddling, gorgeous scenery and wildlife watching—or perhaps a combination of all of these.

current breaks. Stripping a fly or retrieving a topwater plug across that type of cover and structure often results in some jarring hookups from aggressive smallmouths.

Interestingly, as a general rule, anglers who concentrate on working the shoreline won't do well, according to Howell. The Nolichucky features relatively little shoreline cover, and most of the quality-size smallmouths seem to hold in areas within or near the main channel.

The guide, who specializes in fly-fishing, says that bronzebacks weighing up to 4 1/2 pounds fin the Nolichucky, but as is true on most Southeastern upland rivers, a good-size fish runs between 1 and 2 pounds, and a large number of the smallies measure between 10 and 13 inches.

Howell agrees with Rash that the Nolichucky sports a marvelous muskie fishery. He says these toothy behemoths typically hold in 7- to 12-foot-deep holes below plunge pools. They are never easy to catch, and many long-rodders and spin fishermen have seen their lines snap in two after a muskie has attacked flies or lures intended for smallmouths.

Trip Possibilities

"Most folks float from Pigeonroost [on the North Toe River] to Poplar," says Rash. "Poplar is a favorite take-out location since it is maintained by the U.S. Forest Service and has ample parking and restrooms. It is also the launch point for those heading down the gorge."

Howell likes the Huntdale-to-Poplar junket of approximately 7 miles. The trip begins just upstream from where the Cane and North Toe rivers commingle to form the Nolichucky and features one Class II rapid and numerous Class I's and riffles. The guide recommends that, during the summertime, float fishermen and paddlers "watch their slots," that is, the openings between large rocks. The V's that form indicate safe passage through rock obstructions.

Another possibility is to paddle from Poplar to Erwin, Tenn., a voyage of about 13 miles. Howell says that this trip contains some Class IV rapids, as well as Class III's and II's. The larger rapids can be especially daunting, particularly during high-water periods in the spring and fall or during the summer months after a rainfall. If readers decide to undertake this excursion, Howell recommends that

Spin fishing for smallmouth bass or muskellunge is great in the Nolichucky. Muskie anglers should be prepared for a big strike that could lead to tackle-busting action.

they use a professional outfitter. Should individuals desire to fish, they will need licenses from both North Carolina and Tennessee.

One of the things I learned when researching this story is that when western North Carolina folks talk about going fishing on the Nolichucky, they actually often mean the North Toe, the major tributary. Joe Street operates Rivers Edge Outfitters, a fly shop and guide service in Spruce Pine.

Street says that on the North Toe, quality floats exist from Roses Branch Road to the Route 1314 bridge, the Route 1314 bridge to the Route 197 bridge, the Route 197 bridge to the Green Mountain Road bridge, and the Green Mountain Road bridge to the next bridge on the same road upstream from where Brummett Creek enters. All of these excursions take between three and five hours to paddle.

"Generally, upstream from Spruce Pine in Mitchell County to the headwaters of the Nolichucky watershed, you'll find trout," explains Street. "In the area of Spruce Pine, you'll catch both trout and smallmouths; downstream from Spruce Pine, mostly smallmouths."

Home Base: Burnsville

Martin Bartlett, who operates the Nu Wray Inn in Burnsville, believes that outdoor enthusiasts will enjoy their visit to the Nolichucky River and Yancey County.

"Yancey is the only county in North Carolina that does not have a four-lane highway," says Bartlett. "And that old saying about a rural town rolling up its streets at dark is certainly true about Burnsville. We do have a 10 p.m. curfew. So you've got tranquility when you come here—whether you want it or not.

"Outdoor recreation is a prime form of entertainment. A lot of birders, paddlers and fishermen come to the Nolichucky River, and of course, in the summer, hiking and camping are popular in the nearby Pisgah National Forest."

Environmental Progress

Starli McDowell, president of the Toe River Valley Watch, an environmental organization devoted to protecting the watershed, reports on one of the most encouraging recent developments.

"The Spruce Pine dam removal on the North Toe has opened up approximately 44 river miles for fish passage and made the river safer for recreational use," she

Also, the dam's destruction may benefit the endangered Appalachian elktoe mussel, which is found below the former structure. Two rare fish, the olive darter and sharphead darter, historically lived above the dam but now are found only below it. They may be able to colonize upstream eventually.

Trip Account

Last August, I took the Roses Branch Road trip on the North Toe with two guides from Rivers Edge Outfitters, Steve Mingle of Marion and Terry Pritchard of Spruce Pine. We decided to ply the stream with both spinning and fly-fishing equipment, both topwater and subsurface, so as to cover a wide range of smallmouth feeding tendencies. The fly-fishing pattern that Pritchard selected was a rather unusual one.

"There are Ohio lampreys in the watershed," Pritchard explained. "The first time I saw one attached to a fish, I brought it to Rash, and he confirmed what it was. There no reason why a smallmouth wouldn't to eat an eel-like creature, so I created call Terry's eel.

"I worked on this thing a long time to get it right. I wanted something that would at level in the water column but would shimmy when I retrieved it."

Pritchard's pattern is some 5 inches and he has caught Nolichucky and North Toe bronzebacks up to 19 inches long this pattern. Mingle agreed that eels are mon in the watershed and said that to take advantage of that fact, he uses Yamamoto Senkos, which he feels are a reasonable imitation of the creatures.

We put in on the North Toe around 11 as the three of us concurred that summer time smallmouth action on North Carolina rivers is often better in the afternoon, when the damsel- and dragonfly hatches begin—usually sometime after 12 p.m.. Not surprisingly, the first 12-incher was caught just after noon, when we began seeing damselflies hovering in increased numbers over the water. Pritchard used a hard plastic minnow imitation to fool that fish.

r that, the North Toe steadily pro-
smallmouths between 12 and 15
long for all three of us. Not surpris-
based on Mingle's and Pritchard's
ents about the lamprey population,
caught several nice smallies on the
noto Senko, while I scored with the
lagic Stik, a similar soft plastic. I also
14-inch bass on the Rapala Original
w and Cordell Big O. Most of our
nouths were holding in current breaks
the river's many ledges or in shade
s beneath sycamores.
use our trip took place in mid-August,
ly not prime time for watching birds
hearing their songs, as the breeding
was over, I heard few avians. But I did
osprey and hear such species as gold-
, pileated woodpeckers and Carolina
lees. A trip down the watershed in mid-
would surely result in many dozens of
eing observed. Indeed, the Nolichucky
e ribbon stream in every respect.
e Nolichucky and North Toe are cer-
great places to go after smallmouths,"
ns Street. "From June through mid-
nber, the topwater action can be fan-
As recently as the 1970s, pollution
noff from mining and the textile and
re industries resulted in a lot of waste
n the watershed.
t thanks to the Clean Water Act, those
e gone, and the river has made
legree turnaround."

Ingram is the author of four
n river fishing, including "The
ver Guide" and "Fly and Spin
for River Smallmouths." For
formation, contact Ingram at
am@juno.com.

Effective fly patterns

Kevin Howell of Davidson River Outfitters says these are some of his favorite patterns for the Nolichucky's smallmouths.

POPPERS
Chocklett's Disc Slider in chartreuse, size 10
Sneaky Pete in chartreuse, sizes 4 to 8
Dink in purple or chartreuse, size 8
Clouser Floating Minnow, size 1

STREAMERS
Walker's Wiggler in olive and white, sizes 1/0 to 2
Clouser Minnow in olive and white, sizes 1/0 to 6
Black Bunny Leech, size 2
Olive Woolly Bugger, sizes 6 to 10
White Lead-Eye Woolly Bugger, sizes 4 to 6

NYMPHS
Howell's Big Nasty, size 6
Howell's Ole Hellgy, size 4
Clouser Crayfish, sizes 4 to 6
Howell's Stoneymite, sizes 4 to 8
Yuk Bug, sizes 4 to 8

Joe Street of Rivers Edge Outfitters states that a summer selection of patterns would include these choices.

Brown Wiggle Minnow, size 2
Stealth Bomber, size 2
Olive Eel Zonker, size 2
White Zonker, size 4
Yellow Dot Popper, size 4
Blue Dot Popper, sizes 4 and 6
Damselfly floater, size 4

Trip Planner

DAVIDSON RIVER OUTFITTERS: www.davidsonflyfishing.com, (828) 877-4181 or 1-888-861-0111

RIVERS EDGE OUTFITTERS: www.riversedgeoutfitters.com, (828) 765-FISH [3474]

BURNSVILLE AND YANCEY COUNTY CHAMBER OF COMMERCE: www.yanceyburnsville.com, (828) 682-7413 or 1-800-948-1632

TOE RIVER VALLEY WATCH: www.toerivervalleywatch.org

MAPS: www.fishwatermaps.com, (828) 279-0959 (This series of maps is a great help for those wishing to explore the Nolichucky watershed. Also recommended is the *North Carolina Atlas & Gazetteer*: www.delorme.com.)

NU WRAY INN, BURNSVILLE: www.nuwrayinn.com, (828) 682-2329 or 1-800-368-9729

NOTE: Kevin Howell says that a flow of 77 cubic feet per second (cfs) is the bare minimum required to float the Nolichucky. On one planned summertime float, he had to cancel a trip with me when the river was flowing at 29–30 cfs. For more information on stream flow conditions contact Real Time Data for North Carolina: www.waterdata.usgs.gov/nc/nwis/rt.

WILDLIFE IN NORTH CAROLINA 2011 PHOTO COMPETITION

***WILDLIFE IN NORTH CAROLINA* MAGAZINE IS PROUD TO ANNOUNCE THE SEVENTH ANNUAL INSTALLMENT OF OUR HIGHLY POPULA AND WILDLY SUCESSFUL PHOTO COMPETITION.** Last year, 1,270 photographers entered more than 5,500 great images. This yea your winning photo could be published on the cover of this magazine.

The N.C. Museum of Natural Sciences, our founding partner, is a fantastic place to learn about North Carolina's wildlife an wild places through its exhibits and classes. Another photo competition partner, the N.C. Division of Parks and Recreation, manage North Carolina's outstanding state parks. These are ideal places to photograph wild animals and wild landscapes. Park rangers ca give photographers expert advice on the best subjects, locations and times of year for nature photography in state parks. Thanks t partner UNC-TV, you don't have to leave home to become educated about our state's wonderful natural resources—just turn o North Carolina Public Television's programming.

Beautiful nature photos from North Carolina have inspired generations of people to be better stewards of our precious natura resources. Excellent wildlife photography taken in state parks and other conservation lands across the Mountains, Piedmont an Coastal Plain has been the cornerstone of *Wildlife in North Carolina* magazine, of exhibits at the N.C. Museum of Natural Scienc and of programming on UNC-TV for many decades.

The *Wildlife in North Carolina* Photo Competition aims to encourage people to participate in nature photography, thereby fosterin greater understanding and appreciation of North Carolina's wildlife and wild places. Winning photographs will be published in th January–February 2012 issue of *Wildlife in North Carolina*. Thanks to our exhibition sponsor, JW Photo Labs of Raleigh, the winner will also be exhibited at the Museum of Natural Sciences and at other science museums and wildlife education centers across th state in 2012.

Visit www.ncwildlife.org, the museum, any of North Carolina's 41 state parks, or any of the seven statewide locations of ou corporate sponsor, Great Outdoor Provision Co., for more information about the competition. Then get outside and show us you best nature photography!

T.J. HILLIARD

Dedicated scouting for photo subjects can result in dynamic pictures such as this uncommon pine snake in a defensive posture, photographed in the Sandhills.

2011 COMPETITION RULES

MAY ENTER

r and professional photographers, except loyees of the N.C. Wildlife Resources Com-, the N.C. Museum of Natural Sciences, the vision of Parks & Recreation, UNC-TV and utdoor Provision Co., and their immediate (children, siblings and spouses).

TO ENTER

will be judged in 10 categories:

als
s & Amphibians
brates
ndscapes: The peaks, valleys, plains and of North Carolina.
ants: Wild-growing plants and fungi only, g their flowers, leaves, fruits and other parts. ely no cultivated plants will be accepted.
r Recreation: Show how people interact rth Carolina's natural world through activ- t are inextricably linked to nature, such as , fishing, hiking, rock climbing or canoeing.
Behavior: Anything animals do, from every- vities to interactions with other animals to behavior.
Photographer, 13–17: Any of the above , shot by photographers under 18.
Photographer, 12 & under: Any of the bjects, shot by children 12 and younger.

aphs must have been taken in North no earlier than Sept. 1, 2006.

must declare on your entry form if your aph is of an animal in captivity, such as at ture center or rehabilitation facility. Please nter photos of animals that are both captive native to North Carolina (for example, polar lions at the N.C. Zoo).

ets or domestic animals will be accepted, exception of animals participating with n outdoor recreation (for example, hunting iders on horseback).

e do not harass wildlife in an attempt to aph it.

pulation of images, either film or digital, e limited to conventional darkroom tech- r basic sharpening and cropping. Images ontain only the subject matter as originally ough the viewfinder. Multiple exposures, stitched photos, high dynamic range nd photos containing any manipulated or ntent will not be accepted and should not ed.

Entries may not contain any text or images aside from that contained in the subject matter. Date stamps, signatures, frames and trail camera information are not permitted, regardless of whether they are added during or after the image is photographed. Original images may be cropped to eliminate date stamps or other text.

An entrant must hold all rights to a photograph. Photos previously published or pending publication, or that violate or infringe upon another person's copyright, are not eligible. Please do not infringe on the rights of property owners in an attempt to photograph animals.

HOW TO ENTER

Visit www.ncwildlife.org, click on the Photo Competition link, and then click the Enter a Photo link to submit a photograph. Only JPEG files smaller than 2 MB will be accepted for upload. Upload your photo using the online entry form on the website. Repeat this process for each photo entered. Entrants may submit a maximum of two (2) photos per category.

The competition begins at 8 a.m. on Wednesday, June 1, 2011. Entries must be uploaded by 5 p.m. on Thursday, Sept. 1, 2011. Entrants may verify receipt of entries by checking www.ncwildlife.org and clicking the Photo Competition link to view a text list of all entries.

An image may be entered in only one category. For instance, if a photo of a preening wood duck might fit in Birds or Animal Behavior, you must choose the one category in which you want the image to compete.

Entrants in the youth categories must be the appropriate age for the category entered on the closing date of the competition. Once a youth photographer has entered two photos in the proper youth category, they may enter other photos in any other categories they wish.

PRIZES

All winners will be published in the January–February 2012 issue of *Wildlife in North Carolina* magazine and exhibited at the N.C. Museum of Natural Sciences in Raleigh. Winners will also receive a print of their winning entry from JW Photo Labs of Raleigh and products from sponsor Great Outdoor Provision Co.

Grand prize: Your photo published on the cover of the January–February 2012 issue of *Wildlife in North Carolina* magazine, plus $200.

First place, all categories: $100.

Second place, all categories: $75.

Third place, all categories: $50.

Special state parks prize: One photo taken in North Carolina state parks, regardless of category, will be selected as Best of State Parks. The winner will receive camping passes at their choice of North Carolina state parks and other noncash prizes to be determined. Finalists in consideration for this honor will be exhibited at various parks across the state.

JUDGES

Winners will be selected by a panel comprised of staff of the N.C. Wildlife Resources Commission, the N.C. Museum of Natural Sciences, the N.C. Division of Parks and Recreation and professional wildlife photographers.

THE FINE PRINT

By entering the *Wildlife in North Carolina* 2011 Photo Competition, entrants grant all sponsors the right to publish and use submitted photographs in print or electronic form to promote the competition. Reproduction of entries will include photographer credit.

Entrants agree that if their submission is selected as a winner, they grant all sponsors the right to display their photograph(s) at venues including but not limited to the N.C. Museum of Natural Sciences. Exhibition of entries will include photographer credit.

Entrants will be asked on the online entry form if their photo was taken in a North Carolina state park. All such entries will be provided to the N.C. Division of Parks and Recreation for possible usage in public information or promotional materials, park displays or agency press releases to various statewide media outlets. Any such usage will include photographer credit.

Winners will be required to provide original source material—slides, high-resolution digital files or negatives—for reproduction in the magazine and for exhibition prints. Original digital files of winning photos must be accompanied by a color print of at least 4x6 inches.

Wildlife in North Carolina staff will determine entry eligibility.

QUESTIONS?

Please do not call about entries. Send questions to competition@ncwildlife.org.

Enter online at www.ncwildlife.org.

Meandering through dark woods, swamps and thickets, these are ...

Mysterious Rivers

written and illustrated by Helen Correll / nature activity by Anne M. Runyon

When you wade into some rivers in the southeastern Coastal Plain, the water swirling around your knees is brown, like strong tea, and the sandy bottom glows amber. If you are not familiar with this type of river you might think, "Yuck, this water is dirty!" But it is not dirty at all. The dark water tells you that you are standing in a blackwater river; one that was born in Coastal Plain swamps, its water stained by acids leached from leaves decaying there. Blackwater rivers are part of a rare and beautiful ecosystem that drains the Coastal Plain. They occur in other places around the world, but the only location to have as many blackwater rivers as the southern United States is the Amazon River basin.

PLAIN DRAIN

Scattered throughout North Carolina's Coastal Plain are hardwood swamps and wetlands fed by underground springs. Unlike the springs in the Piedmont and Mountains, these springs bubble up onto somewhat flat, sandy surfaces where they puddle into huge expanses of waterlogged soils. Hardwood swamps are home to trees and other plants that love wet soil. Year after year leaves, needles, twigs and bark fall into the water. Trees die and fall, and new ones take their place. Organic matter in the water will sit and steep until the swamp is like a big jug of "swamp tea." Tannins (brown-colored acids) are leached from the debris, staining the water brown. The highly acidic water drains out of the swamps and meanders across the Coastal Plain toward the ocean. As these rivers wind along, creeks that drain water from other swamps join them. Rainwaters flood swamps along the rivers' edges and spill even more "tea" into the rivers. They drain into the ocean.

Some of the blackwater rivers of North Caro are the Cape Fear, Cashie, Chowan and Lumb rivers, as well as the Scuppernong, White O and Waccamaw rivers and their tributaries.

TREES WITH KNEES

A blackwater river and its surrounding swamps and bottomlands depend on trees that are adapted to life in water. The hardwood swamps are home to cottonwood, ash, swamp white oak, as well as pin oak, water tupelo and birch trees. Lining the river corridor are black willow, red maples, dogwood and smaller shrubs like buttonbush and alders. Further downriver are cypress swamps. Here the dominant tree is the deciduous bald cypress, with needle-like leaves that drop in the fall. Their trunks flare at the base, and "knees" grow up into the air from their roots. Alongside the cypress grow huge water tupelos, also with swollen bases, but without knees. Growing here as well are red maples, Carolina ash (also called water ash) and possumhaw, a deciduous holly tree.

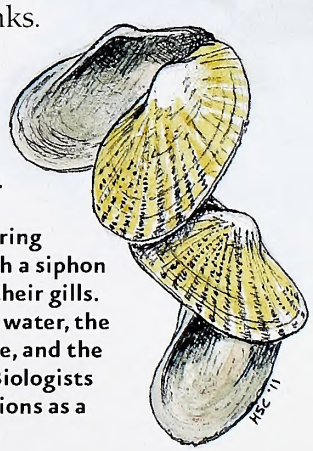
WINGED WILDLIFE

A great variety of birds live and nest in the lush, moss-strewn jungle growth of swamps and blackwater river bottoms. Tall and lanky, great blue herons wade along the river's edge to find frogs, fish and salamanders. Other wading birds here are little blue herons, great egrets and endangered wood storks. Wood ducks and mallards are a common sight paddling through duckweed-covered water amid the wide trunks and knees of bald cypress and tupelo trees. Noisy pileated woodpeckers scream in flight between dead trees, and their rapid hammering echoes through the swamps. Ospreys and hawks hunt prey through the day while barred owls hunt smaller critters through dark, swampy nights. Many migratory, neotropical songbirds arrive in the summer to build nests and breed in the bottomland forests, so prothonotary, Swainson's and yellow-rumped warblers and colorful Northern parulas flit between maples and willows along the banks.

TURE FEATURES

water rivers and the swamps that surround them are teeming with ife. Black bears find it a perfect habitat. Bobcats, gray foxes, white- deer, raccoons, river otters and opossums abound. American alligators ze in the sun on white, sandy banks, their tails trailing in the amber shallows. Fallen logs are a favorite basking spot for common blackwater turtles known as yellow-bellied sliders. They line up along logs, all sizes crammed together to catch a little sunshine.

The river channels are home to largemouth bass, pickerel, gar and catfish, as well as smaller creatures such as brown water snakes, crayfish, aquatic snails and freshwater mussels. As the rivers come within the influence of ocean tides you can also find saltwater species such as flounder, spot, croakers and eels.



Freshwater mussels live in groups at the bottom of the channel. They are filter feeders, drawing in oxygen-bearing water and food through a siphon where it is filtered by their gills. If pollutants are in the water, the mussels get sick and die, and the population dwindles. Biologists look at mussel populations as a sign of a river's health.

The term "blackwater" comes from the fact that on cloudy days (and from a distance) the river water looks black and opaque.

THEN AND NOW

People have used North Carolina's blackwater rivers since prehistoric times. Some of our blackwater river names, such as the Chowan and the Waccamaw, reflect Native American tribes that lived nearby. With no rocks or waterfalls, the rivers are easy to navigate. This was a plus for early settlers in Carolina who traveled up the rivers on longboats filled with their worldly goods.

Unfortunately, these rivers are easily harmed by introduction of contaminants such as fertilizer ru and animal waste, nitrogen and phosphorus from w water treatment facilities, and sediment from poor trol of soil erosion. Many species of freshwater mu are endangered.

Get Outside

Make sun tea to get an idea of how a blackwater river becomes stained brown:

Wash a clear container thoroughly. Put in 4 cups of cold water. Add five regular (black tea) teabags. Place the container in direct sunlight for at least two hours. Check often to see the water pull the soluble tannins from the tea leaves. Taste the tea occasionally to see if it's ready. Remove the tea bags and pour into glasses over ice. Add sugar if desired. Drink immediately. Do not store.

Read and Find Out

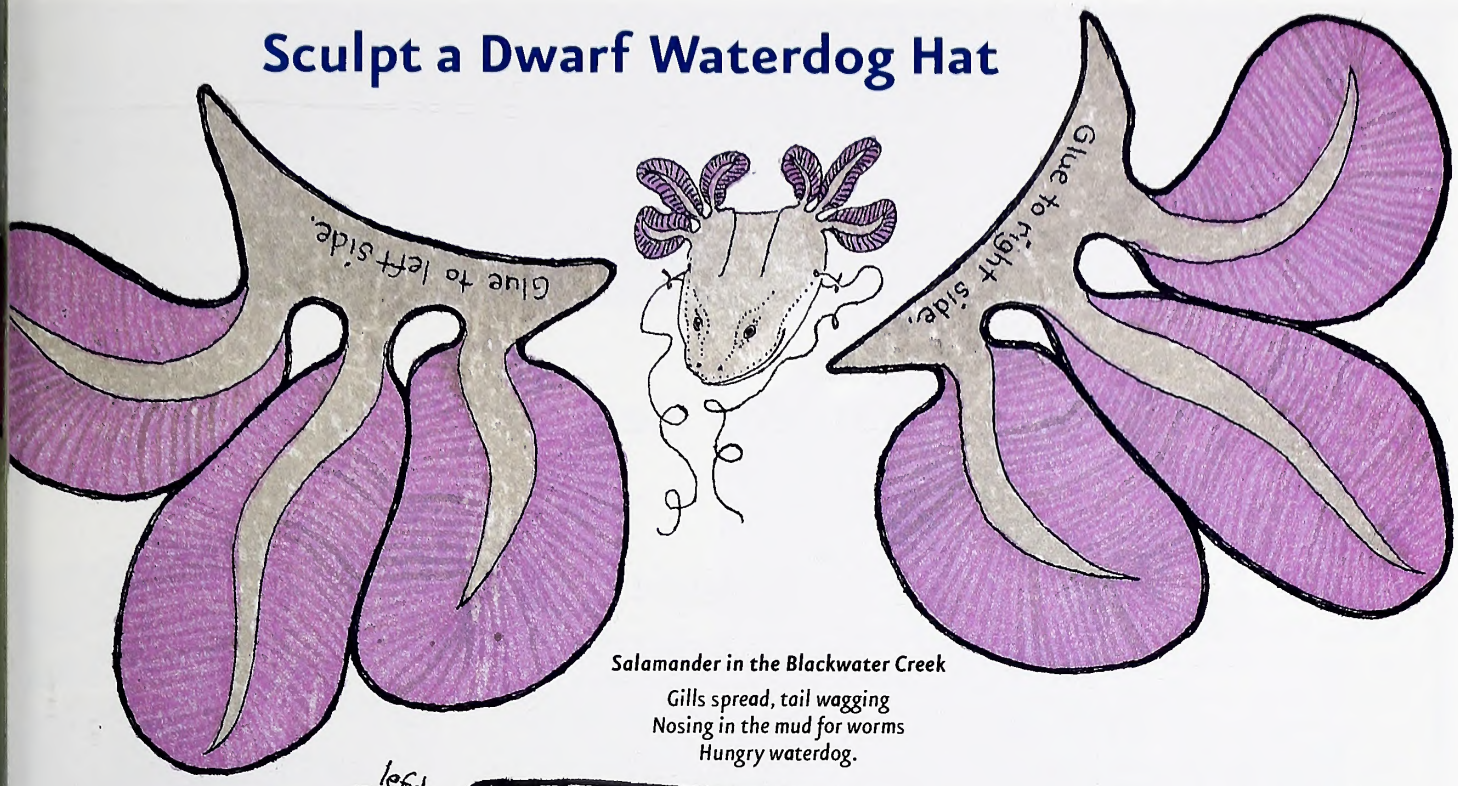
- "Living by a River" by Carol Baldwin, Heinemann Library Publishers, 2
- "North Carolina Rivers: Facts, Legends and Lore" by John Jairr, The History Press, 2007.

In *Wildlife in North Carolina:*

- "Places to Keep" by Jim Dean, July 1984.
- "A Life on Black Water" by Ted Dossett and Lawrence Earley, January 1

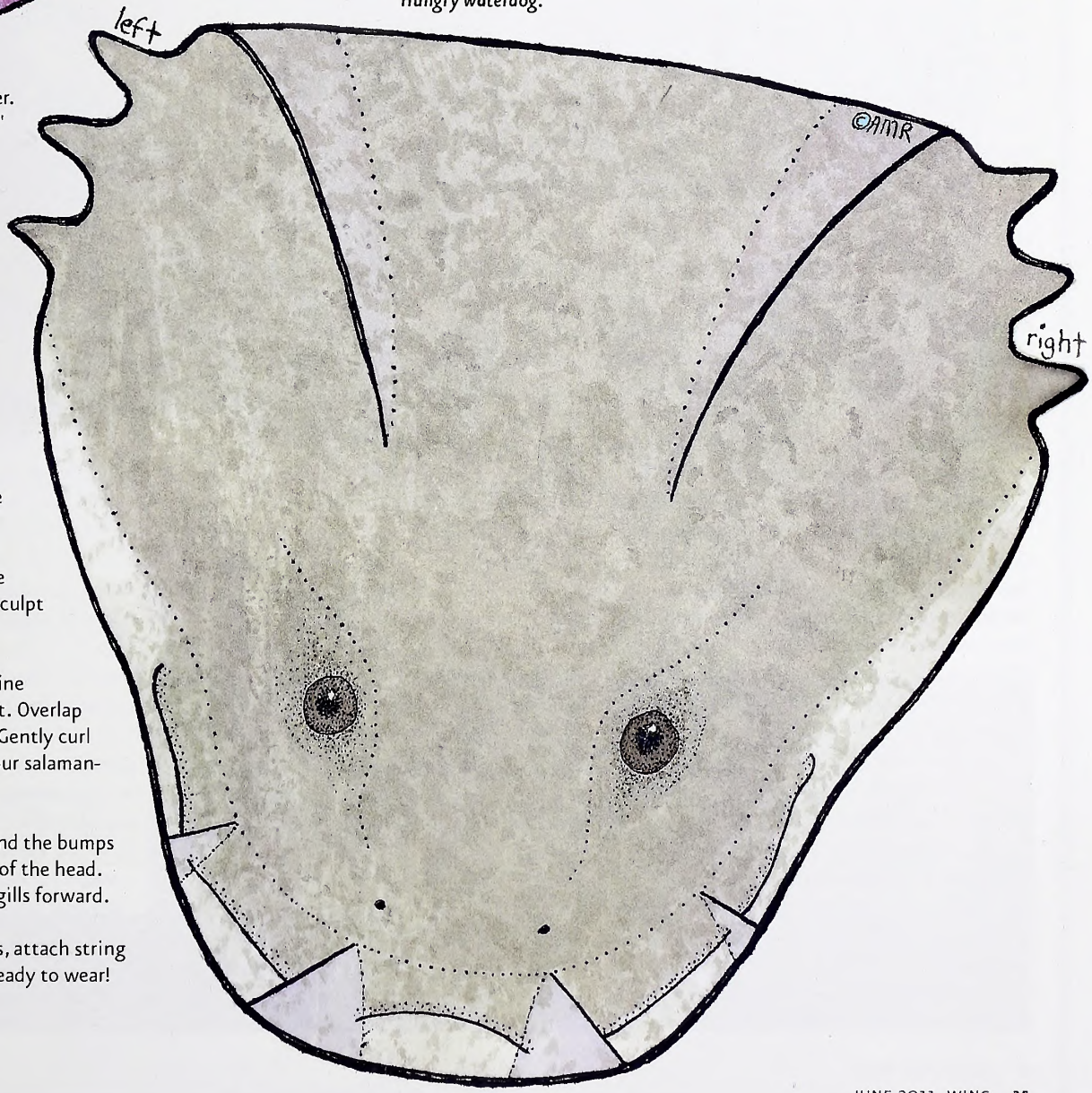
Find out more about Project WILD Workshops and literature at the Wildli Commission's website at www.ncwildlife.org.

Sculpt a Dwarf Waterdog Hat



Salamander in the Blackwater Creek

Gills spread, tail wagging
Nosing in the mud for worms
Hungry waterdog.



opy design on heavy paper. Copy at 140% on 11" x 17" aper for large hat.)

ut out face and gills long thick black lines. lso cut 2 slits in fore- ead and 4 slits on chin. or more realistic frilled ills, cut a fringe in the eddish areas.

old down along the 2 urved ···· lines on fore- ead. Matching the cut dges to the ···· lines, glue he forehead shut.

ently fold down along the ·· lines over the eyes to sculpt he face.

ently fold down the ···· line long the edge of the snout. Overlap ll the slits and glue shut. Gently curl own the chin to sculpt your salaman- er's smooth head.

lue the gills in place behind the bumps n the right and left sides of the head. ently twist and turn the gills forward.

unch holes below the gills, attach string r ribbon and your hat is ready to wear!

back porch

NEWS and NOTES

Edited by Jim Wilson

WINC Announces New Business Plan

Wildlife in North Carolina, the monthly magazine published by the N.C. Wildlife Resources Commission, will change publication schedules beginning in July to accommodate rising costs and to become a more self-sustaining effort.

The magazine will publish six issues a year and introduce two seasonal special editions (fall and spring guides to the outdoors) that will contain advertising.

"The magazine once was heavily subsidized by the commission, but that previous funding is no longer available," said Greg Jenkins, editor of the magazine. "So we had to look at options and we've undertaken the best compromise we could, and still continue to satisfy our many loyal readers."

The magazine is in its 75th year and has some 48,000 subscribers. Noted for its exceptional color photography and great articles on hunting, fishing and the outdoors, *Wildlife in North Carolina* is consistently rated among the best of the nation's magazines published by conservation organizations, state or federal agencies.

Jenkins said a marketing campaign by staff has been started to build circulation. Subscriptions will remain at $12 a year. An advertising campaign for the special guide editions has been started to increase revenue.

"This is a budgetary matter in tough fiscal times," Jenkins said. "We are fortunate to have a talented staff, as well as tremendous support from sportsmen and other nature lovers. The magazine will make adjustments but won't sacrifice quality."

One- and three-year subscriptions, and foreign subscriptions, are available online at www.ncwildlife.org. Fall and spring outdoor guides are available only by subscribing to the magazine. To guarantee yourself a fall guide, subscribe before Aug. 1 at the website or by calling 1-866-945-3746.

IN SEASON

This month, these seasons are open in North Carolina:

Hatchery Supported Trout Waters: Through Feb. 28, 2012.

Crow: Wednesday, Friday and Saturday of each week between June 1 and July 31, plus Independence Day. See 2011–2012 *Regulations Digest* for additional dates.

There is no closed season or bag limit for g… hog, coyote, striped skunk, nutria and arm… There is an open season for taking beaver… firearms or bow and arrow during any oth… season for the taking of wild animals.

Check the 2010–2011 *North Carolina Inland … Hunting and Trapping Regulations Digest* for ba… and applicable maps or visit www.ncwildli…

e NEWSLETTER

Get N.C. Wildlife Update—news including season dates, bag limits, legislative updates and more—delivered to your Inbox from the N.C. Wildlife Resources Commission. Sign up at www.ncwildlife.org/enews.

Virginia Man Breaks North Carolina Bluefin Tuna Record

irginia man set a new North Carolina state record for bluefin hen he reeled in an 805-pound, 8-ounce fish off Oregon Inlet h. Corey Schultz of Waverly, Va., caught the fish aboard the *Sea* out of Oregon Inlet Fishing Center. The fish measured 112 curved fork length with a 76-inch girth.

ltz caught the fish on a Shimano 80 rod and reel using 130-pound e with ballyhoo for bait. "It was all that rod and reel wanted, I you that," Schultz said. Schultz caught a 350-pound tuna with ie captain—Ned Ashby—last year and released the catch. Then, : used a 50-wide reel. This year, he used an 80-wide reel.

new within the first few minutes it was not the same caliber Schultz said. He fought the fish for about 2½ hours and had) 1,000 yards of line out. Everyone in the boat's party of six, tion to the captain and mate, helped to get the fish on board. an unforgettable experience, that's for sure," Schultz said.

previous North Carolina state record bluefin tuna weighed unds and was caught off Oregon Inlet in 1995. The International Fish Association record bluefin tuna weighed 1,496 pounds and ught off Nova Scotia in 1979.

he time of the record catch, the bluefin tuna retention for limit vate recreational vessels was one trophy bluefin (measuring ies or greater) per vessel per year. Starting on April 2, the blue- its changed and the trophy fishery was closed.

chultz (left) with fishing buddy Patrick Hughes and the record tuna.

COURTESY OF COREY SCHULTZ

Ribbon Cutting Opens New Weldon Boating Access Area

n time for striper season in the ckfish Capital of the World," the Wildlife Resources Commission held a cutting in early April on the newly ted Weldon Boating Access Area.

site, one of the oldest boat fishing the state, is packed each year with ds of anglers ready to cast a line for bass in the Roanoke River. The Boat- ess Area has new courtesy docks and en expanded from two launch lanes .

w, fishermen will be able to launch oats much faster and have more time " Weldon Mayor Julia Meacham said the ribbon cutting ceremony. "Weldon d to be the Rockfish Capital of the and we are equally proud of the newly ted boat access area here at the ke River Landing. The natural beauty rocks, the rapids, the water and the pleasure people derive from fishing Mother Nature at her best."

th Carolina Rep. Michael Wray and Jones also attended the ribbon cutting.

The renovations, which occurred over the course of two winters, were funded from the Sport Fish Restoration Program and motorboat registration receipts. The site has a plaque commemorating Dale Morris, a boating technician with the Wildlife Commission for 22 years who worked in the Weldon area. He completed an initial set of renovations on the Weldon Boating Access Area some 20 years ago. Morris died in 2009.

"This site is one of North America's premier fishing areas and has quite a history," said Erik Christofferson, chief of the commission's Division of Engineering Services. "Years ago, boats used to be launched on a rail system. They would then winch it back up. It is still one of our most popular sites."

For more information on boating in North Carolina, including an interactive map of free, 24-hour boating access areas; valuable information on boating regulations; and a schedule of boating safety classes, visit www.ncwildlife.org/Boating_Waterways/index.htm.

NCWRC

NCWRC

CALENDAR OF EVENTS

Wednesday, June 1

Registration opens for the North American Association for Environmental Education 40th Annual Conference scheduled for Oct. 12–15 in Raleigh. Three days of concurrent sessions, plenary sessions, networking, workshops and field experiences. Visit www.naaee.net/conference.com.

Saturday, June 4

Kick off National Fishing and Boating Week by taking a child fishing from 9 a.m. to noon at the Youth Fishing Rodeo at Strayhorn Pond between Hillsborough and Chapel Hill. Call (919) 245-2660.

Friday–Saturday, June 10–18

Check out the 53rd annual Big Rock Blue Marlin Tournament in Morehead City. Visit www.thebigrock.com.

Saturday, June 25

Come have fun at the Kid's Fishing Derby at Coffey Lake in Beech Mountain. Open to children ages 4–12. Hours 8 a.m.–12 p.m. Visit www.beechmountainchamber.com.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

Renovations Completed on Snow's Cut, Federal Point

The N.C. Wildlife Resources Commission has completed renovations on a pair of boating access areas near Wilmington — Snow's Cut in Carolina Beach and Federal Point in Kure Beach.

The commission received $500,000 in funding from sales of the Coastal Recreational Fishing License to assist in the improvements at Snow's Cut. About $400,000 from motorboat registration receipts also went toward the cost.

"When funding like this is available to upgrade such a popular coastal site, the boaters and anglers of North Carolina benefit from the improved access," said Erik Christofferson, chief of the commission's Division of Engineering Services. "We are so grateful to receive this grant from the N.C. Division of Marine Fisheries, which allows us to make such a first-class upgrade to Snow's Cut."

Improvements to the site include more than 100 feet of additional dock space, plus new make-ready and tie-down lanes. The site also now has an additional launch lane, for a total of five boat ramps, 83 trailer parking spaces and 16 single-vehicle spaces.

"The Division of Marine Fisheries is happy to work with the Wildlife Resources Commission on this type of multi-use ject that provides fishing access to diff types of coastal recreational anglers," Division of Marine Fisheries Directo Louis Daniel.

Federal Point has newly paved parki for both trailers and single vehicles, a l walk for beach access and concrete side Last winter, during the first phase of the vation, the site received new ramps, fl docks, a new concrete apron and new head, breakwater and a retaining wall boat ramp was once inside an excav basin, aligned perpendicular to the s line. The basin was filled in and the new built along the restored shoreline.

"These renovations will make acc Buzzard Bay easier and more convenie boaters who come from across the state extremely popular spot," said Christof "We are grateful for the partnerships other agencies that allowed us to make renovations to Federal Point."

A large portion of phase one was fu from a Division of Coastal Managem Grant. Phase two was funded through of the Coastal Recreational Fishing Li Additional costs were covered by mot registration receipts.

Visit www.ncwildlife.org/Boating_Waterways/index.htm for more information on boating in North Carolina, including an interactive map of free, 24-hour boating access areas.

THE WILDLIFE ENDOWMENT FUND

An Investment for the Future

Established in 1981, the Wildlife Endowment Fund allows the Wildlife Resources Commission to accept tax-deductible contributions for wildlife conservation. Money from the sale of lifetime licenses and lifetime magazine subscriptions is also placed in this fund. Your donation or purchase will ensure that North Carolina will have a rich wildlife heritage for generations to come.

Lifetime License Form

Infant and Youth *(check appropriate block)*:

- ☐ Sportsman Infant $200
  (under 1 yeor old—Applicotion must be received before applicant has attained 1 year of age.)
- ☐ Unified Sportsman/Coastal Recreational Fishing Infant $275
  (under 1 year old—Application must be received before opplicont hos ottained 1 yeor of age.)
- ☐ Sportsman Youth $350
  (oges 1 through 11—Applicotion must be received before opplicant has attained 12 years of oge.)
- ☐ Unified Sportsman/Coastal Recreational Fishing Youth $450
  (ages 1 through 11—Applicotion must be received before opplicant hos attained 12 years of age.)

A copy of the birth certificate must accompany applications for infant and youth licenses. Birth certificate documentation cannot be returned.

Note: Pending satisfactory completion of the hunter safety course, persons who possess infant or youth licenses may exercise the privileges thereof when accompanied by an adult who is properly licensed to hunt in North Carolina. "Accompanied" is defined as maintaining a proximity to the hunter which enables the adult to monitor the activities of, and communicate with, the hunter at all times.

Adult (age 12 or older) *(check appropriate block)*:

- ☐ Comprehensive Inland Fishing. $250
  (N.C. residents only—includes basic inland fishing, trout & trout waters on game lands)
- ☐ Comprehensive Hunting. $250
  (N.C. residents only—includes bosic hunting, big gome, gome londs & N.C. waterfowl)
- ☐ Sportsman. $500
  (N.C. residents only oge 12 or older—includes basic hunting & inland fishing, big game, game lands, trout & N.C. woterfowl)
- ☐ Coastal Recreational Fishing $250
  (N.C. residents only—includes coastal recreationol fishing)
- ☐ Unified Sportsman/Coastal Recreational Fishing $675
  (N.C. residents only—includes same privileges os the Sportsmon, plus coostol recreotional fishing)

A federal waterfowl stamp must be purchased separately for all N.C. hunting licenses.

Note: On or after July 1, 1991, a person, regardless of age, may not procure a hunting license or hunt in North Carolina without producing a certificate of competency for completing the hunter safety course or a hunting license effective prior to July 1, 1991, or by signing the statement below that he or she had such a license.

Check appropriate block and attach required copy:

- ☐ Copy of Prior Year Hunting License
- ☐ Copy of Hunter Safety Certificate of Competence
- ☐ In lieu of copy, I am signing the statement below:

Statement: I certify that I was a licensed hunter prior to July 1, 1991.

Signature _____ Date _____

Visit us online at www.ncwildlife.org or call 1-888-248-6834 for a complete list of lifetime licenses, including those for nonresidents and 65 and older.

Lifetime License

Complete the following information if applying for a lifetime license. Be sure to check appropriate block(s) on reverse side ***(please print legibly)*****:**

Name of Applicant_____

Daytime Phone _____

Mailing Address_____

Resident Address_____

County _____Date of Birth _____ Driver License # _____

E-mail Address_____

Is this license a gift? ☐ Yes ☐ No If yes, mail license to ☐ Donor or ☐ Applicant.

License Donor's Name *(if applicable)* _____

Donor's Telephone # _____

Donor's Mailing Address_____

City _____ State _____ Zip_____

Method of Payment: ☐ Check ☐ VISA ☐ MasterCard

Acct. #_____ Expires _____

Print name exactly as it appears on credit card _____

Cardholder's Signature_____ Date_____

Personalize your Lifetime License for an additional $5:
Indicate your selection of letters, numbers, dashes, periods, commas and /or blanks up to 6 spaces: ___ ___ ___ ___ ___ ___

Indicate your personal message including letters, numbers, dashes, periods, commas and /or blanks up to 21 spaces:

___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

___ ___ ___ ___ ___ ___ ___ ___ ___ ___

Signature of Applicant or Donor _____ Date_____

Note: Only adult lifetime licenses may be purchased by phone or online (VISA or MasterCard only). Call toll-free (1-888-248-6834) or visit us at www.ncwildlife.org. Use this form to purchase infant and youth lifetime licenses by mail.

Tax-Deductible Contribution

☐ I wish to make a tax-deductible contribution to the Wildlife Endowment Fund.
Enclosed is my check for $_____. ***(Credit card payments cannot be accepted.)***

Name _____

Daytime Phone_____

Mailing Address _____

City _____ State_____ Zip _____

Make checks payable to: ***Wildlife Endowment Fund***

Transactians are not considered final until the check has cleared the bank. Items purchased with a returned check will be made invalid. A service charge af up ta $25 will be charged an any returned check. (N.C.G.S. 25-3-506)

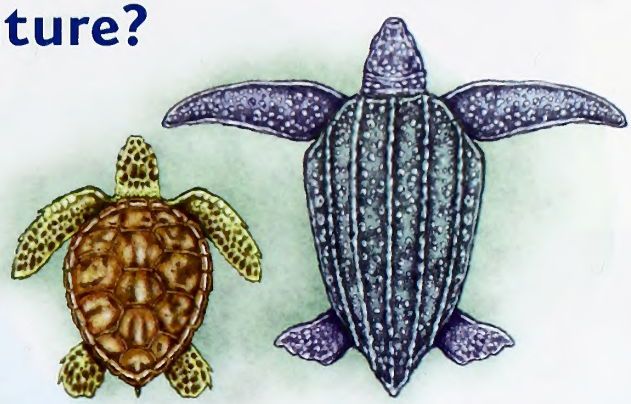
Mail completed application and payment to:
NCWRC, License Section, 1707 Mail Service Center, Raleigh, N.C. 27699-1707

Office location: *NCSU Centennial Campus, 1751 Varsity Drive, Raleigh, N.C. 27606*
Telephone: 1-888-248-6834 (2HUNTFISH)

low Do Leatherback Sea Turtles Maintain Their Body Temperature?

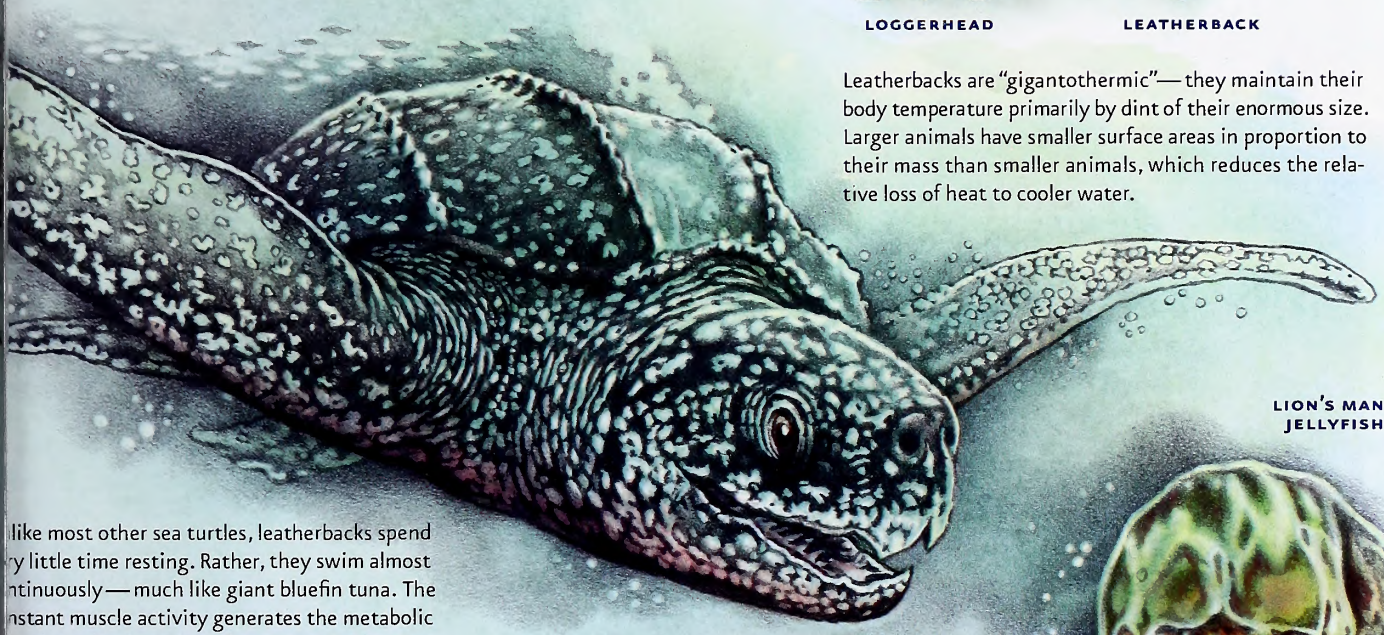
tten by Clyde Sorenson
strated by Jim Brown

ATHERBACK SEA TURTLES HAVE THE LARGEST natural range of y reptile on the face of the planet, thanks largely to their ability to maintain elatively stable body temperature, allowing them to exploit the cold northern d southern seas. Leatherbacks exploit a suite of adaptations found in many ner kinds of marine animals to regulate their body heat.



LOGGERHEAD LEATHERBACK

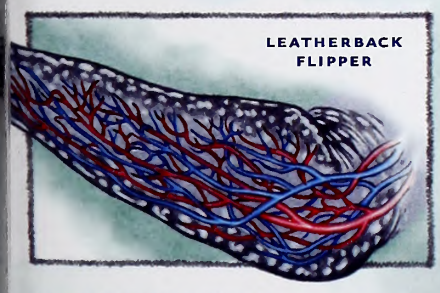
Leatherbacks are "gigantothermic"—they maintain their body temperature primarily by dint of their enormous size. Larger animals have smaller surface areas in proportion to their mass than smaller animals, which reduces the relative loss of heat to cooler water.



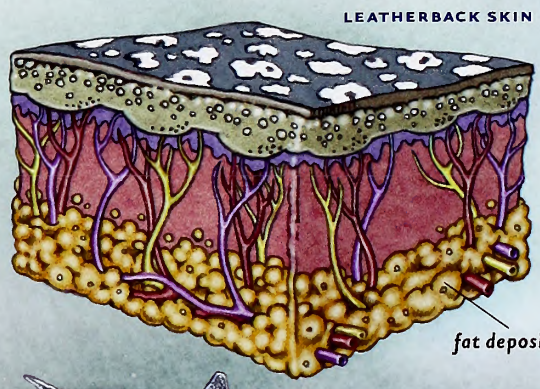
LION'S MANE JELLYFISH

like most other sea turtles, leatherbacks spend y little time resting. Rather, they swim almost ntinuously—much like giant bluefin tuna. The nstant muscle activity generates the metabolic at the animal needs and conserves. A heat change system in the forelimb flippers allows e animal to regulate heat loss through its limbs.

They also have large deposits of fat in and under their thick skin, which functions like the blubber of whales and other marine mammals to insulate the body core.



HEAT EXCHANGE SYSTEM



here is some evidence that the turtles may also e deep dives to cool off in warmer water—by ving to the cold depths, the turtles can shed cess heat. However, we don't really know for re why they sometimes dive to more than 000 feet.

Bounty Hunters

written by Jim Dean

This past spring, stuffed into an economy seat at 38,000 feet above sea level, I realized that I had once again stupidly failed to pack any snacks for the long flight. People around me were eating chips, candy bars and sandwiches they had brought with them, but I had nothing. I couldn't anticipate even a tiny courtesy bag of peanuts, and I was pretty sure the celery stalk in a pricey Bloody Mary wouldn't suffice. I was starving.

JIM DEAN

Some time later, I realized that my feet kept kicking something. I unbuckled my seat belt and squirmed around so that I could reach whatever it was. I expected a crumpled flight magazine or a barf bag, but instead I came up with a magnum chocolate and peanut butter energy bar that had apparently been dropped by some former passenger. Though slightly mashed, the foil was intact. It was delicious. And so, I might add, was the Bloody Mary I purchased to celebrate my good fortune.

"Foraging is seldom a matter of necessity for most of us nowadays, but our ancient hunter-gatherer instincts remain intact."

Foraging is seldom a matter of necessity for most of us nowadays, but our ancient hunter-gatherer instincts remain intact. There is something about "found" food that makes it taste better, and like many of my friends and their families, I will stalk gratuitous edibles on occasion (I don't mean dumpster diving). It might be a family hunt along rural roadsides for wild blackberries and raspberries, or a more predictably successful trip to a pick-your-own strawberry farm. It's the unexpected bounty that yields the most satisfaction, however.

Last year, a summer storm blew a dozen ripe peaches off a tree up the street, and the flowing gutter deposited them in a neat pile next to my mailbox. They were scrumptious, but not nearly as good as those my old buddy Tom Cooper found years ago alongside a remote stretch of Wilson Creek miles from the nearest gravel road. The tree was likely a volunteer that had grown up near a crumbling chimney marking the site of an old cabin, but those peaches were sublime. Tom crammed as many as he could carry in his fishing vest and pockets, and he still had a few left to share with me later, although his juice-stained shirt and peach-fuzzed face revealed the extent of his gluttony.

One should always be open to such discoveries, but you can also plan some of your foraging. I typically begin in early spring in remote high country glades looking for ramps (those wild garlic-like, oniony plan that are famous for their pungency and persistence). You can smell an aficionado of raw ramps upwind fo three days, giving new meaning to "the first breath o spring." Spring also yields emerging ferns still in the fiddlehead stage that are great in salads, along with morels and other edible wild mushrooms.

As spring advances, crabbing (especially for soft-shells) and clamming are worthy pursuits. Then come berry picking and summer fruits. My favorites as a child were tiny sour cherries that my Mom paid me 10 cents a quart to pick (plus all the pie I could eat).

Perhaps the most bountiful season of serendipitou harvest begins in late summer and runs into winter. Last September, my son Scott and I joined my broth John and his wife Beth after recent rains promised a bumper crop of mushrooms near their home in Valle Crucis (John knows which to safely eat). We returne with paper sacks full of chanterelles and black trumpet

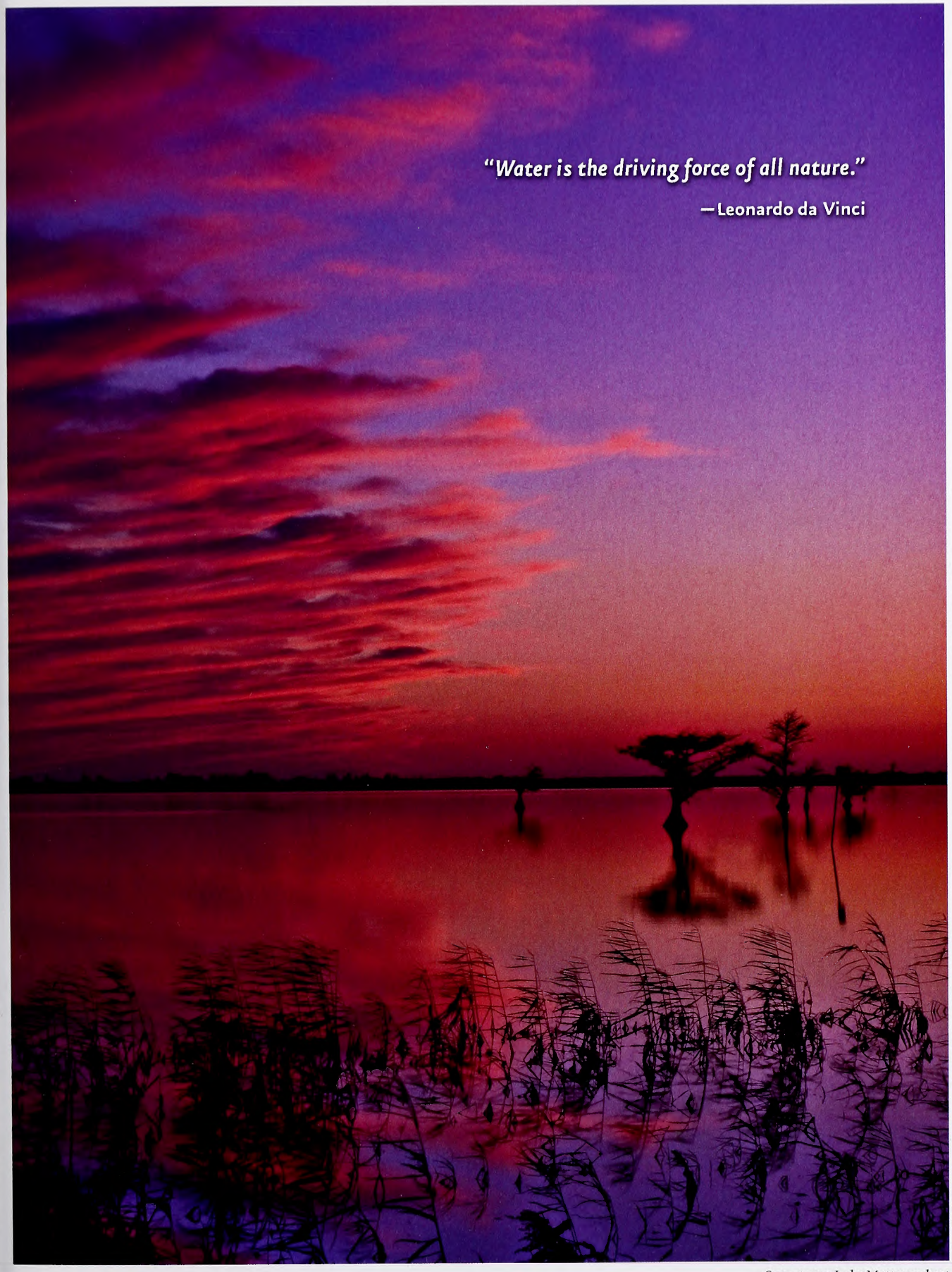
North Carolina's mountains and foothills also harb many abandoned orchards. If you know where they a and don't mind climbing steep trails, you can find lo of apples, including delicious rare old varieties.

Premeditated theft is discouraged, but a pocket casually stuffed with blueberries or the random wate melon can, I believe, fall into the public domain witl out much guilt. The same goes for a ripe German Johnson tomato hanging over your neighbor's fence

Late fall and early winter offer many other oppor tunities to scavenge delectables. On a crisp fall after noon, an oyster knife and a skiff pulled up to a bed o legal oysters hopefully untainted by pollution can yield a feast—even if you didn't bring horseradish ketchup and Tabasco.

As winter pitches its serious tent, there is still trea ure to be found—raw peanuts and soybeans, or a cold dirt-stained turnip yanked out of the ground and eaten like an apple. I'm also on the lookout for nearly rotten windfall persimmons (and will fight the ground hornets and wasps for them). Deep in th season, I occasionally still find an old locust tree wit its long black pods leaking sweet amber syrup (my grandfather made beer with these pods by layering them with clean straw in a barrel, topping it off wit water and letting it ferment).

All this free-range bounty—and much more—is there for anyone who takes the time to look for it Of course, it helps if you aren't overly squeamish about a little dirt or the occasional worm or other critter who is sharing your meal.

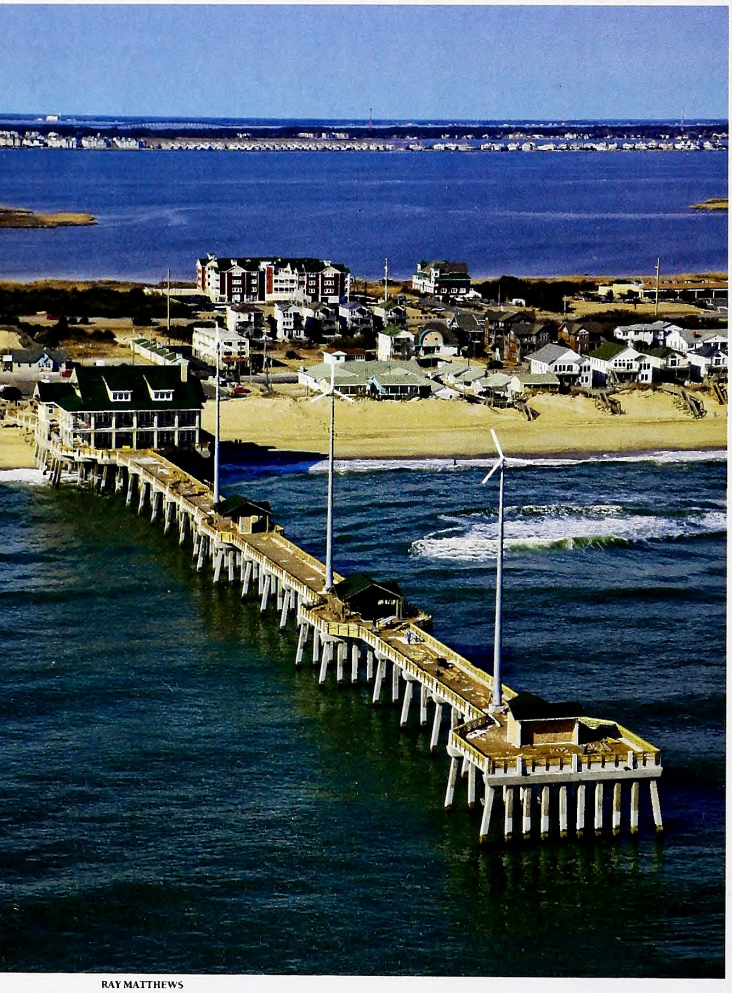


JOHN C. STROUD

Sunset over Lake Mattamuskeet

OUTDOOR MOMENT

IN THE JULY/AUGUST ISSUE



RAY MATTHEWS

1,000 FEET OF FUN

An all-new Jennette's Pier opens this spring, with a long fishing structure and a pier house full of exhibits.

TAILORED PROTECTION

The Piedmont Land Conservancy works to conserve precious places in the center of North Carolina.

DEAD OR DYNAMIC?

The secret to fishing success on Lake James is knowing how to approach the reservoir with a fly-rod.

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WILDLIFE IN NORTH CAROLINA

NORTH CAROLINA Wildlife RESOURCES COMMISSION

Members of the Audubon Society of Forsyth County assist the Piedmont Land Conservancy in removing exotic species near Bethania, a National Historic Landmark.
PHOTOGRAPH BY MELISSA McGAW/NCWRC.

Volume 75 | Number 7

WILDLIFE IN NORTH CAROLINA

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Cover: Fierce in aspect but no larger than 12 inches, viperfish live in 5,000-foot depths off the North Carolina coast. PHOTOGRAPH BY TODD PUSSER.

Wildlife in North Carolina is the offieial educational publieation of the North Carolina Wildlife Resourees Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

This issue marks a time of significant transition. Not only is this the first issue of the magazine under its new bimonthly publishing schedule, this is my final editor's note. By now I have been gone from the magazine staff for a month, off to work in the private sector.

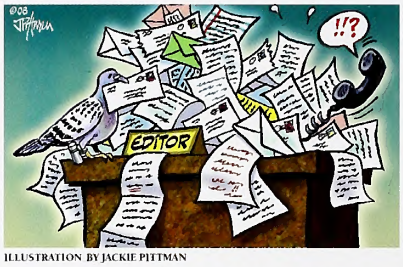

ILLUSTRATION BY JACKIE PITTMAN

As the magazine and I move into new and different phases of our existence, I think about all of the issues I worked on (just shy of 100) and the many stories I wrote or edited (lost count). I'm proud of the work our staff did together and the balance the magazine has shown over the years. I'm pleased that the magazine's new business plan will allow it to thrive another 75 years and beyond.

Leaving *Wildlife in North Carolina* is a bittersweet change for me. Being editor of this magazine was the most fun job I ever had. The two things I liked best were learning something new every day and working with really great people who take pride in doing their jobs well.

Another aspect that I enjoyed was interacting with readers. This magazine has the most loyal, dedicated, passionate, curious and knowledgeable readers of any publication anywhere. You can look it up—those plaudits are backed up by the results of the reader survey we conducted in 2009. Continued support from readers is absolutely critical to the magazine's future survival and success. Consider this a parting challenge from me: If you love this magazine, give at least one gift subscription to someone else who might like it. Even as *WINC* eases into the digital age eventually, getting the printed magazine in the hands of outdoor enthusiasts will remain an important way of getting the agency's message out.

I will watch with keen interest to see what my friends and former colleagues do with the magazine over the coming years. I know that they will keep its standards and quality high, and I know that you will tell them if you think that they don't.

It has been a privilege and pleasure to work for this publication. I appreciated the opportunity to serve, educate and entertain the people of North Carolina. The magazine will always hold a special place in my heart as I join you in the eager anticipation of receiving it in the mailbox every other month.

Greg Jenkins

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IN NORTH CAROLINA
JULY • AUGUST 2011 VOLUME 75, NU

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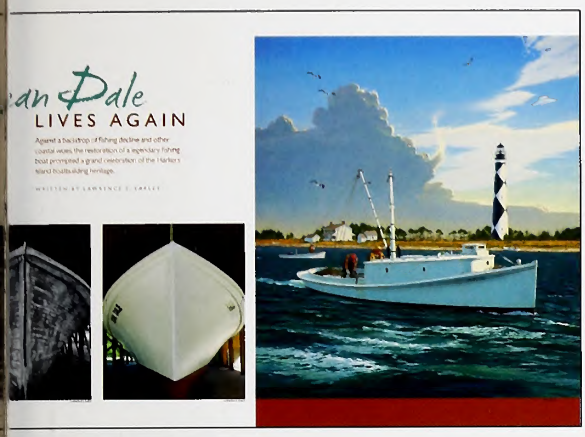


Good Cause

kins: We neglected to mention an important it Robert Dance's artwork "Cape Lookout " featured in "The Jean Dale Lives Again" ay 2011 issue. Dance is selling prints of this nother painting of the boat at sea (entitled he Jean Dale"). Proceeds benefit the Core aterfowl Museum and Heritage Center's con- okeep and care of the restored sink-netter. w.robertbdance.com to order the prints and Down East commercial fishing heritage.

agazine Matters

sappointed and quite perplexed to read coming changes to the magazine in the ue's Editor's Note. Even after changes I d with, such as moving Jim Dean to the ge, caving in by deleting "On Patrol" adily moving away from a hunting and oundation, I continue to believe the tion is superb and a treasure to hold d. It is often a visual masterpiece. That a few years ago, I chose to invest in a subscription and that is why I need s to these questions: Why wait until no time for public comment and a pos- in to assist before planned implemen- Announce in the May issue for July plementation? It appears you had/have ntion of receiving input from the sub- you serve. How do you intend to address us who invested in the future of *Wild- orth Carolina* magazine by paying for a subscription? Applying your 12-for-12 and 36-for-36 issues would be nice: I would live two lifetimes. Please delay your plan until those of us who really care have time to suggest alternatives.

E.T. Weaver
Jefferson

The reduction of the publishing schedule is disappointing, but quite understandable in today's economic and publishing environments. My sense is that the quality of your fine publication will not suffer in the least. In fact, the enhancements should bring added enjoyment and enlightenment. Some may object to the addition of advertisers, but I do not. Advertisements can round out the learning experience, providing additional sources of information and services. And don't forget the revenue, which will certainly help.

I truly value *Wildlife in North Carolina*, and the May issue is no exception, from the white squirrel on the cover to the wonderful Harkers Island boat restoration.

J.E. (Jeb) Britton III
Virginia Beach, Va.

I am very displeased with the proposed changes in *Wildlife in North Carolina*. My first complaint is in your fall and spring outdoor guides, which will contain lots of content on hunting, fishing and boating, plus advertising. I do not buy this magazine for that type of information. I buy it to learn more about the flora and fauna of North Carolina. I am a birder and wildflower seeker. Your articles on other types of wildlife are selling your mag to a lot of readers who have no interest in the killing of game animals. Many of your readers would like to see articles on wildflowers, rare birds, etc. What you should have done was conduct a poll of your readers, explaining that cost-cutting was needed instead of jumping into advertising.

Walt Kent
Lenoir

Greg Jenkins: We conducted a major survey of subscribers in 2009 and published the results in 2011. In creating our response to a major loss of funding this year, we considered the information we gained in the survey. We believe that many of our readers will enjoy the guides because they will contain a wealth of information that will help hunters, anglers, boaters and wildlife watchers alike enjoy North Carolina's wild animals and wild places. Those who were fortunate enough to purchase a lifetime subscription are still getting a sweet deal — if you keep it for 20 years, your cost is $7.50 per year. And we hope that our lifetime subscribers keep their subs for much longer than 20 years.

A Reason to Grouse

I just read "A Bird for All Seasons" about grouse in the May 2011 issue. I know space is limited in these articles, but that is no reason for misinformation. First, author Julie Dunlap says grouse populations are on a 10-year cycle. That is not true in the southern Appalachian range. Grouse in N.C. are totally dependent on habitat for population growth or decline.

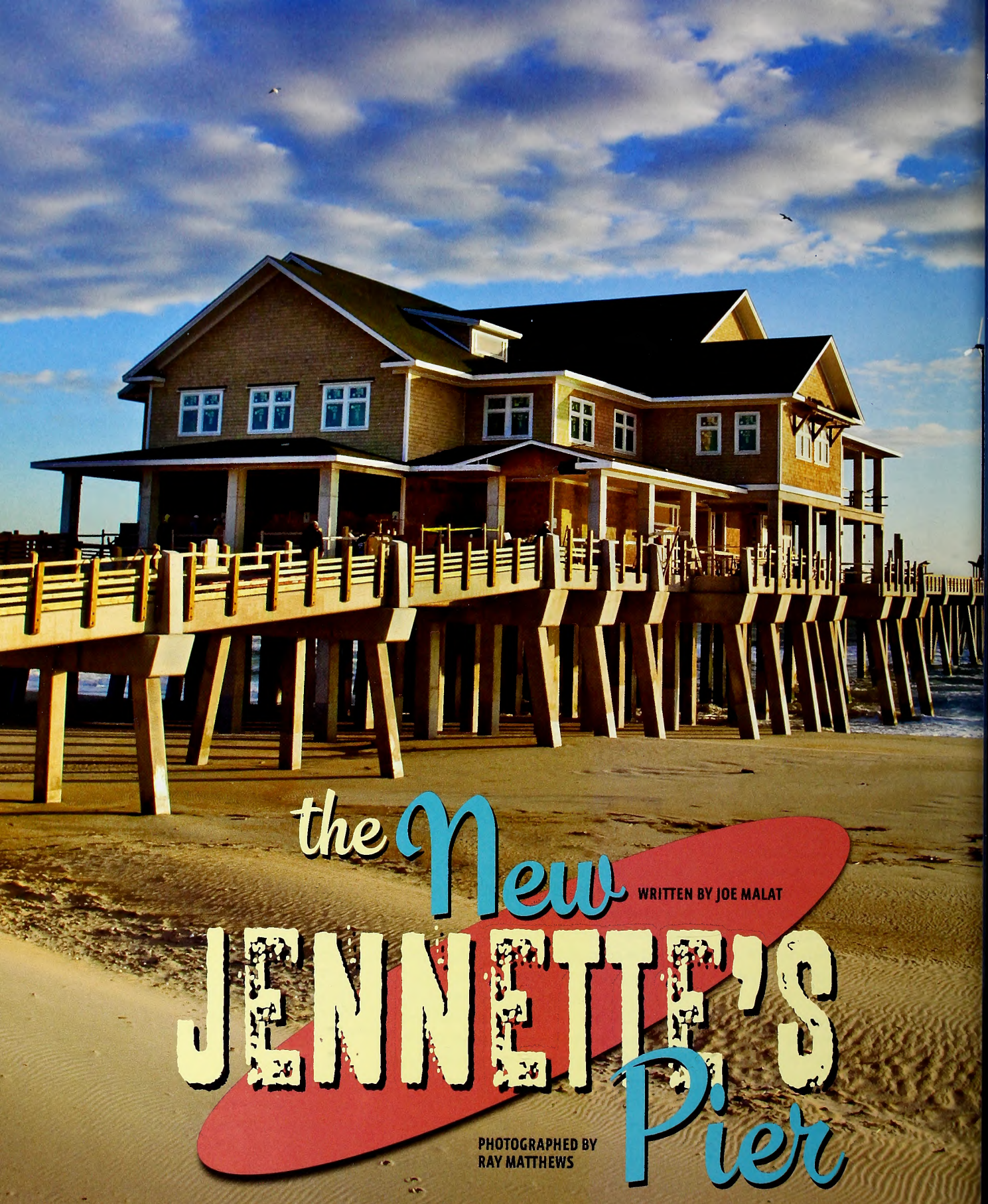
Which brings me to the most egregious misstatement. She states, "Preventing natural disturbances or turning woodlands into stumps (emphasis added) mean fewer birds." Her implication is that harvesting timber is bad for grouse. Just the opposite is true. NCWRC data over the last 20 years show a direct correlation between the decrease of timber harvests in our mountains and a decline in grouse populations. Regenerating young forests from timber harvest, early successional forests, is just what grouse need for winter cover. This has been proven through scientific study. Timber harvests are not only good, but essential, for grouse survival.

Don Mallicot
Asheville

Greg Jenkins: We blew it on the 10-year cycle, Don. You are correct that it is a natural occurrence in more Northern climates. The statement about stumps was meant to indicate that forest habitat destruction — not normal timber management — is bad for grouse. We have always and will continue to support responsible forest management and harvests that benefit wildlife.

rite us

tters should be sent via e-mail to **letters@ncwildlife.org** *or through regular mail to Letters,* Wildlife in North Carolina *magazine, 1712 Mail Service Center, Raleigh, NC 27699-1712. ease include your name, address and daytime phone number. Letters chosen for publication may be edited for clarity and length.*



the New JENNETTE'S Pier

WRITTEN BY JOE MALAT

PHOTOGRAPHED BY RAY MATTHEWS

A DECADES-OLD OUTER BANKS FISHING LANDMARK IS REBORN AS AN ECOLOGICALLY SUSTAINABLE DESTINATION FOR PIER ANGLERS, SCHOOL GROUPS AND TOURISTS.

On May 22, 2009, 70 years after construction of the original pier, a vibrant Carolina blue sky provided the backdrop for a festive "sandbreaking" ceremony for the "new" Jennette's Pier in Nags Head.

North Carolina governor Beverly Perdue, along with legislators, local and regional officials, and N.C. Aquariums leaders, spoke to several hundred enthusiastic onlookers about the new pier and their vision of what it would mean to the citizens of North Carolina and visitors to Dare County.

Within weeks after the celebration, the construction process began. Month by month the pier rose like a phoenix from a barren and neglected patch of sand, sea grass and concrete. The new Jennette's Pier opened on May 21 of this year. The two-story, 16,000-square-foot pier house is a breathtaking architectural and engineering marvel.

It's doubtful that the Jennette family, when the original pier was founded seven decades ago, could have imagined what the future might hold. Completed in 1939, Jennette's was the first fishing pier constructed on the Outer Banks. William S. Jennette, from Elizabeth City, purchased 570 feet of oceanfront property, along with several abandoned buildings formerly used as housing by the Works Progress Administration (WPA). When the original pier was completed, it reached 740 feet into the ocean, and the former WPA cabins were converted into rooms for visitors. Word spread about the pier, and the fishermen came.

ew Jennette's combines the
tional look of a pier with green
nology, such as wind turbines.

Among the pier's features are a system for reclaiming wastewater (top), plus cleaning stations and a how-to for anglers on cleaning their catch.

Unfortunately, the wooden structure collapsed into the ocean in 1943, but the pier was rebuilt after War II ended. Business thrived, and Jennette's Pier was at the hub of activity as the Outer Banks beca widely known as a fishing and vacation destination.

However, throughout the next few decades the brutal environment of the Atlantic Ocean dealt the ture several crippling blows. In 1960 Hurricane Donna unearthed an old shipwreck and drove it thro the pier. Repairs were made but were short-lived, as the Ash Wednesday storm of March 1962 devast the Outer Banks and destroyed the pier and pier house.

After this catastrophic nor'easter, the pier was once again rebuilt. In 1996, Jennette's Pier received lift that included a new 9,000-square-foot pier house with a 70-seat restaurant, a game room and a ta shop. The cottages and parking area were renovated. Not long after this renovation, rumors and spec swirled locally about a developer taking control of the property, but that never happened.

In 2002 the N.C. Aquarium Society, the private, nonprofit, membership-based support organizati N.C. Aquariums, purchased the pier and 5 acres of surrounding property with grants received from the Water Management Trust Fund and financial support from Dare County and the Town of Nags Head

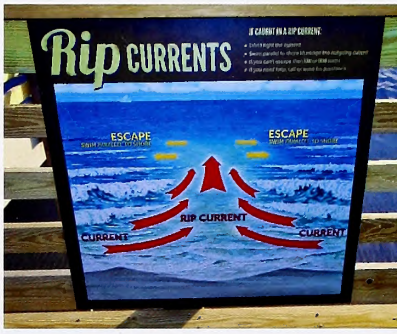
According to Neal Conoley, the Aquarium Society's executive director, the purchase was made for water control, alternative energy demonstrations, educational and recreational opportunities, public access, historical and cultural preservation, and ocean research. With several exhibits and education grams, the pier and pier house became an educational outpost for the N.C. Aquarium on Roanoke Is

However, in September 2003 Hurricane Isabel destroyed about 540 feet of the pier and damaged th tages and other property. Only the battered pier house remained. The Aquarium Society reopened th briefly and continued to conduct educational programs until the end of the 2005 season. The old str was demolished in 2008, paving the way for construction of the new Jennette's Pier.

The new pier became a reality due to the dedicated and persistent efforts of several individuals. Th out the design, development and construction of the new Jennette's Pier, the "point man" on the proje David Griffin, director of the state's Division of Aquariums. Griffin oversees all three of the state-c aquariums—at Roanoke Island, Pine Knoll Shores and Fort Fisher—and he managed the evolution new Jennette's Pier after the Aquarium Society transferred ownership to the state of North Carolina.

Griffin said a major hurdle to jump was acquisition of about $25 million to build the new pier. The ing came from several different sources, including the aquariums' admission fees, Department of En ment and Natural Resources Stormwater Fund, Clean Water Management Trust Fund, North Caro Waterfront Access and Marine Industry Fund and N.C. Aquarium Society.

Clancy and Theys, a Wilmington-based company, was awarded the general construction contract company was also responsible for the construction of and renovations to the aquariums at Pine Knoll and Fort Fisher. Throughout the pier's 24-month construction period, Clancy and Theys employed and North Carolina workers and subcontractors.



Displays are designed to teach visitors about subjects such as the pier's history (left), wind energy and rip currents.

pier is a forerunner of the future, yet the architectural style of the pier house and all of the support ngs is reminiscent of the historic Nags Head cottages and acknowledges the area's heritage.

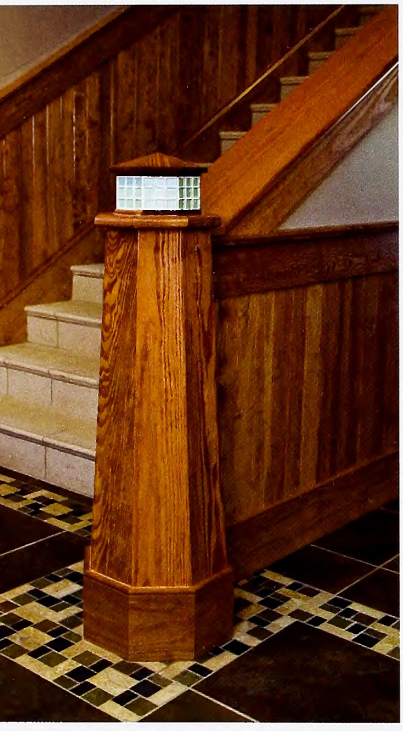
structure strikes an impressive pose. From the west, at the crest of the Melvin R. Daniels Bridge, the hree wind turbines can be seen towering above the surrounding structures. The blades are in constant n from the ever-present Outer Banks breezes, with a movement that seems to make the pier come alive. turbines are a high-profile preview of several sustainable, "green" construction features found through- ne building uses energy-efficient geothermal heating and cooling that eliminates the need for metal round condensing units, which would not survive long in the oceanfront's high-salt environment. ate-of-the-art stormwater system allows rain to drain from the parking lot through pervious pavers to underground storage chambers. Pollutants are trapped in these chambers, and water is returned to al aquifer. The site's wastewater goes into a reclaimed-water system, where it is treated and reused flushing of toilets in the pier and the bathhouse, reducing the amount of municipal water needed by h as 70 percent. Reclaimed water not used by the system is returned to the local aquifer, helping to e the goals of ecologically sustainable development.

- and drought-tolerant plants are used throughout the pier site, reducing the need for artificial irriga- d maintenance. Solar panels power lights at the fish-cleaning stations. The new pier will offer free g and beach access, a public bathhouse with restrooms, and outside showers.

rge "Chip" Hemingway, of BMH Architects in Wilmington, was the pier's lead designer. BMH also ed renovations and expansions of the three N.C. Aquariums. Hemingway, of Chapel Hill, spent much 46 years in the Nags Head area, and his design of the pier was influenced by those experiences.

e sheer scale of the project is impressive. We needed to design and build the pier strong enough to and a 100-year storm. More than 200 concrete pilings set from 35 to 50 feet in the ground support the d pier house, which sits high enough to be out of harm's way from breaking waves in the surf zone. e appearance of the buildings fits within the aesthetics of the older Nags Head architecture style," gway said.

The pier is a **FORERUNNER OF THE FUTURE,** yet the architectural style of the pier house and all of the support buildings is **REMINISCENT** of the **HISTORIC** Nags Head cottages and acknowledges **THE AREA'S HERITAGE.**



Although thoroughly modern, Jennette's still manages to reflect a traditional Nags Head look, reflected in a light house newel.

"Under the feel and look of an 'older' structure is a high-tech building including the latest in sust
and green construction techniques and materials," he added. Hemingway said the building will be c
to meet the standards of Leadership in Energy and Environmental Design (LEED), an internationally
nized green building certification system. Hemingway is optimistic the pier will receive a platinum
the highest level of recognition.

"I wanted Jennette's Pier to be in concert with the mission of the aquariums, and I hope visitors wi
something about the environment when they visit. The building itself is an exhibit," he said.

As visitors enter the property, they will immediately see signs and graphics located around the pa
lot, at the bathhouse and near the pier's main entrance ramp. An exhibit about the history of Jennett
is near the front entrance. Inside the pier house, exhibit tanks display the variety of fish typically fou
around the pier, with one featuring red drum, the official saltwater fish of North Carolina.

The new Jennette's is certain to become one of the premier fishing piers along the entire East C
Speckled trout, puppy drum, pompano, spot, sea mullet and flounder feed primarily among the dyi
bait-filled, breaking waves of the surf zone, and anglers will line the pier railings to pursue them. B
the first time in history, pier fishermen on the Outer Banks can also fish 1,000 feet offshore, where b
mackerel, cobia, giant red drum and tarpon feed.

Graphics along the pier depict popular and effective local lures and rigs. Two fish-cleaning tables
pictures and step-by-step directions on the fine arts of filleting a flounder and cleaning a bluefish.

Exhibits about coastal weather, surfing, rip currents, shorebirds and marine mammals are locate
the entire length of the structure. A functional classroom is found on the first floor, and a large meetin
upstairs will accommodate busloads of school groups. Jennette's Pier is truly a unique teaching faci

The foundation for the pier and pier house is concrete, but the decking, railings and railing caps ar
of wood to retain the look and feel of a traditional fishing pier. Two shelters located along the pier of
tection from rain and wind. Wooden benches are located along the entire length of the pier.

Several qualified staff members are needed to operate a facility of this size. Pier manager Mike R
hired in 2010, said the pier's core management team will consist of eight full-time positions, and 1
part-time and seasonal employees.

> "I wanted **JENNETTE'S PIER** to be in concert with the **MISSION OF THE AQUARIUMS**, and I hope visitors will **LEARN** something about the **ENVIRONMENT** when they visit. **THE BUILDING ITSELF IS AN EXHIBIT.**" –George "Chip" Hemingway, BMH Architects, Wilmington

pier will accommodate the needs of many different user groups. "First and foremost, we are a state-art public fishing pier and a one-of-a-kind educational facility," Remige said. "We will offer educa-programs and exhibits, alternative energy demonstrations, meeting and reception facilities, a platform entific research, public beach access and bath facilities. We would also like to host as many regional mmunity events as we can accommodate.

e will also offer programs to introduce the novice to pier and surf fishing, with an emphasis on ethical and etiquette. We'll offer beachcombing, sea turtle and marine mammal classes. We can go off-site for d and estuarine ecology classes. Our abundance of new energy-efficient, energy-producing and sustain-chnologies at the facility presents a perfect platform to discuss sustainable design on the coast. I also think uniquely situated to delve into astronomy classes or navigation by the stars from the pier," he added. e said he also hopes to host fishing tournaments, surfing competitions and other community events.

educational mission of the three N.C. Aquariums is "inspiring appreciation and conservation of Carolina's aquatic environments." Jennette's Pier will share the same mission.

ording to Maylon White, director of the N.C. Aquarium at Roanoke Island, the programs and activities locations will complement each other. "We can present programs about the beach habitat more vely at the pier, and programs about the inland water habitats can best be done at the aquarium. Our to make the programs, activities and events at each location interesting enough that people will want both sites to be exposed to another quality experience," he said.

e pier allows us to reach a wider audience, many of whom may not have thought about visiting our um in Manteo. The pier allows everyone the chance to experience the ocean environment in a safe nily-friendly format. We hope that this, combined with the alternative-energy-sources demonstra-nd the beach and ocean exhibits and programs, will deepen their appreciation for the marine environ-This appreciation can lead to an understanding of how truly special North Carolina's coastline is, and ve must do to protect it," White added.

ning piers have provided generations with meaningful family and recreational fishing experiences, but ave slowly disappeared (See "Pier Pressure," June 2006). In 1984, 35 fishing piers covered the North na coast from Kitty Hawk to Calabash, representing more than a fourth of all the ocean piers from to Texas. Now, such well known piers as Long Beach, Barnacle Bill's, Triple S and Sportsman's have eared, most of them replaced by beach-front housing, thus decreasing public access.

ce then, coastal storms, hurricanes and skyrocketing property values have taken a toll on North na's piers, and by 2010 the number of piers had dwindled to fewer than 20. The new Jennette's Pier able current and future generations to have the opportunity to learn about the marine environment, ional fishing, conservation of resources and sustainable building practices. ◆

---

lat is the retired director of the N.C. Aquarium on Roanoke Island. He is a surf fishing instructor and the of several books on fishing. Find out more at joemalat.com.

A Place to Wet a Line

The N.C. Aquariums and the N.C. Aquarium Society led the charge for construction of the new Jennette's Pier and continue to gather support for additional recreational fishing piers near the sites of the N.C. Aquariums at Pine Knoll Shores and Fort Fisher. Find out how you can help by visiting **www.ncaquariums.com.**

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For more information, visit **www.jennettespier.net.**

HIT the TRAIL

Regular walking or hiking can enhance your enjoyment of the outdoors in a multitude of ways.

written by Jonathan Maxwell • photographed by Melissa McGaw

Whether you are a hunter, angler, outdoor photographer or all three, chances are great that in pursuing your chosen activity you do a substantial amount of walking. Being able to walk farther and longer without undue fatigue or risk of injury can determine the success or failure of a day's quest. A certain level of walking fitness is indispensable.

There are many other wonderful—and underappreciated—benefits of a walking regimen. It can be done almost anywhere, inside or outside, on level ground or steep slope, in the rural or urban setting, and in good weather or bad (as the Scots say, there is no bad weather, just the wrong clothes). Any reasonably healthy person can become good at it, and walking fitness and distance can improve dramatically in only a matter of weeks.

The exercise of walking, and the regular exposure to the outdoors, will enhance your energy level and enthusiasm for life and general sense of well-being. In addition to finding that you perform better on the hunt or at your favorite fishing spot, you will perform better on the job and at home, and sleep better at night. You will also find that you sometimes enjoy walking around town instead of driving, observing a multitude of interesting sights you never noticed before—perhaps including wildlife and wild plants. You will become interested in walking to nearby scenic spots, and will probably encounter like-minded individuals who appreciate the outdoors. Walking will recharge your spirit.

To begin walking requires a minimum of gear—primarily comfortable, suitable shoes and a decent rain jacket. In the course of developing a walking routine, you are also getting a hands-on opportunity to try out shoes and outdoor gear to find what fits your particular outdoor needs. For example, deciding whether you prefer the new synthetic fabrics and layered approach, the more traditional wools and other fabrics, or a combination, can best be determined by trying them out and perhaps getting feedback from walking companions about their choices. The same goes for heavier versus lighter boots. Prices and quality of gear vary widely, and careful consideration and testing of the options can make all the difference.

Don't be intimidated—we are just talking about walking here. Each person will have his or her own requirements and abilities. You can start with 20 minutes several days per week, either at lunch or around the neighborhood. The treadmill or elliptical machine at the gym are also excellent places to start, or to escape unsuitable weather. Your body will tell you when it is ready to handle more distance and elevation gain.

Another excellent place to start is to join a local hiking/outing club. Most areas of North Carolina have such clubs, and the number is growing. The Internet works well for locating clubs in your area. These clubs lead regularly scheduled hikes, walks or other outings each week. They provide guides who have walked the trails and who can provide hike descriptions to you. Many of these clubs have newsletters.

Club members are congenial sorts who happily provide feedback on technique, gear, wildlife in the area, and similar topics. These clubs routinely walk some of the wildest and most scenic country in our beautiful state. You are likely to encounter a wide range of wildlife, including bears, deer, grouse and turkeys. Walks range from short to long, easy to strenuous... take your pick. Membership dues are usually nominal.

So here's hoping you'll hit the trail, so that when it comes time to break out the gear, you will be prepared to do your best, safely and enjoyably. If you are lucky, you will also find that walking has enriched your life in many other ways. ◆

Jonathan Maxwell is a legal consultant in Greensboro and a past contributor to WINC. *A former president of the Piedmont Hiking and Outing Club, he has walked through the Grand Canyon and across England.*

WALKING AND HIKING CLUBS

Piedmont Hiking & Outing Club
(Greensboro)
piedmonthikingandoutingclub.org

Winston Wanderers Walking Club
(Winston-Salem)
winstonwanderers.com

Bear Creek Hiking Club (Robbins)
bearcreekhikingclub.com

Asheville Amblers
ashevilleamblers.com

Metrolina Walkers (Charlotte)
metwalk.freeservers.com

Rowan Roamers (Landis)
rowanroamers.org

Triangle Trailblazers (Raleigh)
triangletrailblazers.org

Tar Heel State Walkers
(Winston-Salem)
tarheelwalkers.org

Piedmont Appalachian Trail Walkers
(Greensboro)
path-at.org

Chargers & Rechargers Hiking Club
(Boone) boonenc.org/hiking

Carolina Mountain Club (Asheville)
carolinamtnclub.com

Carolina Berg Wanderers (Charlotte)
meetup.com/hiking-323

Hikers of Iredell Club
(Statesville-Mooresville)
iredellhikingclub.com

Wild Flowers/Haphazard Hikers
(Charlotte)
charlotteladyhikers.com

REDFIN PICKEREL (*Esox americanus*)

The freshwater equivalent of the barracuda, pickerels have keen eyesight and are active predators of small fish, frogs and invertebrates. Redfin pickerels are common residents of freshwater streams and rivers of the coastal plain and piedmont.

SAWCHEEK DARTER (*Etheostoma serrifer*)

This small (less than 3 inches) fish is a common resident of the small creeks throughout the coastal plain of North Carolina. With roughly 200 species, darters are the most diverse fish family in North America.

Portraits of Diversity

PHOTOGRAPHED BY TODD PUSSER

FISH

North Carolina contains the most biodiversity of any temperate region in the world. This series highlights the unique diversity of life found within our state's borders, photographed against neutral backgrounds to emphasize each species' individual characteristics.

At last count, scientists have recognized almost 32,000 species of fish swimming the world's waters—by far the largest order of vertebrate animals. Over half of the known freshwater species in the United States are found in the Southeast. North Carolina, with its mild climate and varied geography of high Mountains, fertile Piedmont and flat Coastal Plain, contains a large part of this diversity. Some 235 species of fish can be found in the fresh waters of North Carolina, including six species found nowhere else in the world.

The warm waters of the Gulf Stream and cold, nutrient-rich waters of the Labrador Current collide off our coastline, providing our state with possibly the highest diversity of marine fish species of any state on the East Coast. No one is certain of the total number of marine species of fish found in North Carolina waters, but it is safe to say that it is well into the hundreds.

Dollar for dollar, fish, more so than any other vertebrate group, provide a large contribution to our state's economy and quality of life. On the financial side, both inland and coastal recreational fishermen pump millions of dollars into the economy each year with the purchase of fishing licenses and equipment. Considering their health aspects, many species of marine fish are rich in omega-3 fatty acids. Consuming these species can be healthy for your heart and aid in brain development and reproduction.

For this feature, I photographed individual fish against neutral black or white backgrounds or used a flash to render the background black. The purpose of this type of photography is to avoid distractions within the frame and to force your eye to concentrate on the beauty and details of each individual fish.

Opportunities abound to see fish found in our state's waters. Take a trip to the zoo or visit one of our state's aquariums. Don a snorkel and mask and dip your head below the cool waters of a mountain stream. For the more adventurous, take a scuba diving trip to some of the offshore shipwrecks that line our coast. Better yet, pick up a rod and reel and take a kid fishing.

The goal of this feature is to inspire the viewer to learn more about the remarkable diversity of life found within our state's waters. Learning leads to appreciation. Appreciation leads to caring. Caring leads to protection. Protecting our fish and water resources will ensure that future generations can enjoy the diversity of life that makes North Carolina such a wonderful place to live.

–Todd Pusser

BANDED PYGMY SUNFISH (*Elassoma zonatum*)

Too small to catch with Zebco 33s, this species of pygm fish measures just shy of 2 inches in length. It is a secreti solitary dweller of blackwater creeks in the Coastal Plain southeastern United States where it is often found unde ing mats of decaying vegetation.

DUSKY SHINER (*Notropis cummingsae*)

Shiners are generally referred to as "bait" by most fishermen. Forming large schools, many species can be abundant in creeks and rivers throughout the state. *Notropis* is the second largest genus of freshwater fresh in North America with over 70 species described.

REDFIN PICKEREL (*Esox americanus*)

Fishermen in the coastal plain of North Carolina frequently refer to this species and its close relative, the chain pickerel (*Esox niger*) as "jackfish". Both species will readily attack fishing lures. A juvenile redfin from Drowning Creek in Moore County is pictured here.

SWAMPFISH (*Chologaster cornuta*)

This small, rarely encountered fish inhabits the oxygen poor waters of coastal plain creeks, hiding under dense mats of decaying plant matter. Its closest relatives are completely blind and live in deep water caves in the southeastern United States.

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CAPE FEAR SHINER (*Notropis mekistocholas*)

This species is found only in the waters associated with the Cape Fear River and nowhere else in the world. Because of its small range, the Cape Fear Shiner is considered an endangered species.

LONGNOSE GAR (*Lepisosteus osseus*)

This primitive fish has been around since the age of the dinosaurs. Longnose gar can reach 6 feet in length and will often rise to the surface and gulp air. Though not considered a game fish, its meat, when smoked, is considered to be very good.

WARMOUTH (*Lepomis gulosus*)

A close relative to bluegills, warmouths are considered an excellent small game fish. They are found throughout most freshwaters of North Carolina. Males of this species will build nests and guard over large number of eggs until they hatch and the fry depart.

SAND TIGER SHARK (*Carcharias taurus*)

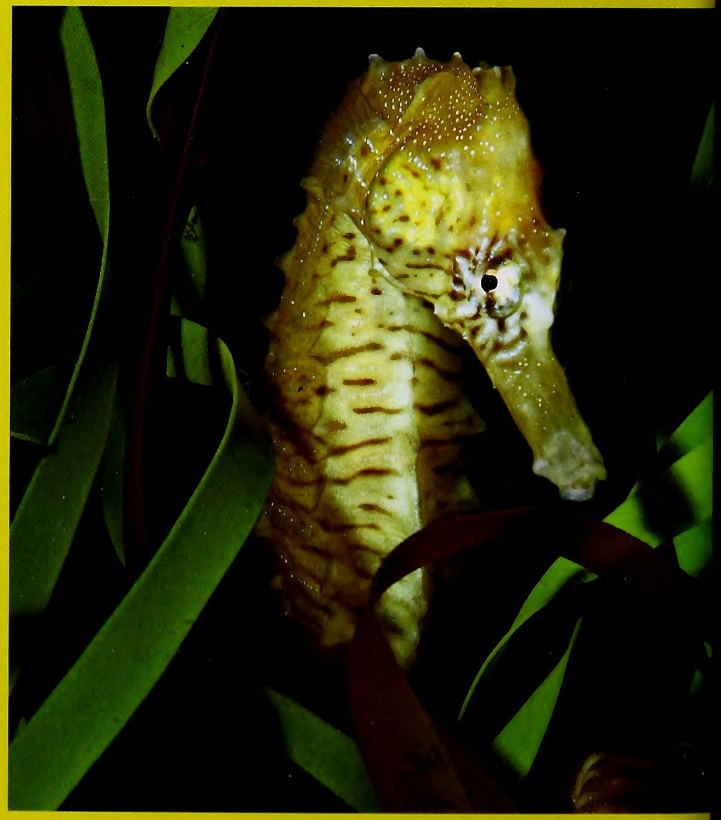
Divers from all over the world flock to North Carolina for the chance to swim with these large docile sharks that frequent offshore shipwrecks. Their large toothy mouths make sand tigers popular draws at our North Carolina Aquariums.

SANDBAR SHARK (*Carcharhinus plumbeus*)

A common inshore shark off the North Carolina coastline, sandbars can reach lengths of 9 feet or more. Young of this species are caught off fishing piers during summer months and are frequently referred to as "sand sharks".

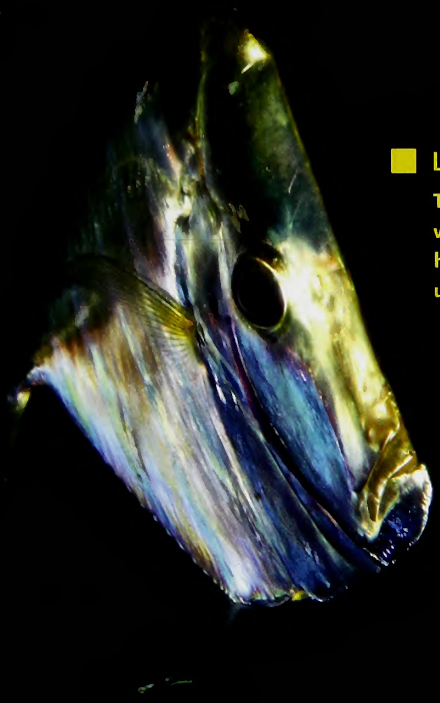
LINED SEAHORSE (*Hippocampus erectus*)

Seahorses are often referred to as miniature dragons of the sea. Unique among any vertebrate on earth, male seahorses experience the pain of childbirth, sometimes bearing as many as 300 young at one time.



PORKFISH (*Anisotremus virginicus*)

This is a common schooling fish in shallow coastal waters of North Carolina. When caught, this species releases air from its swim bladder producing grunt-like noises not unlike that of a pig.



LOOKDOWN (*Selene vomer*)

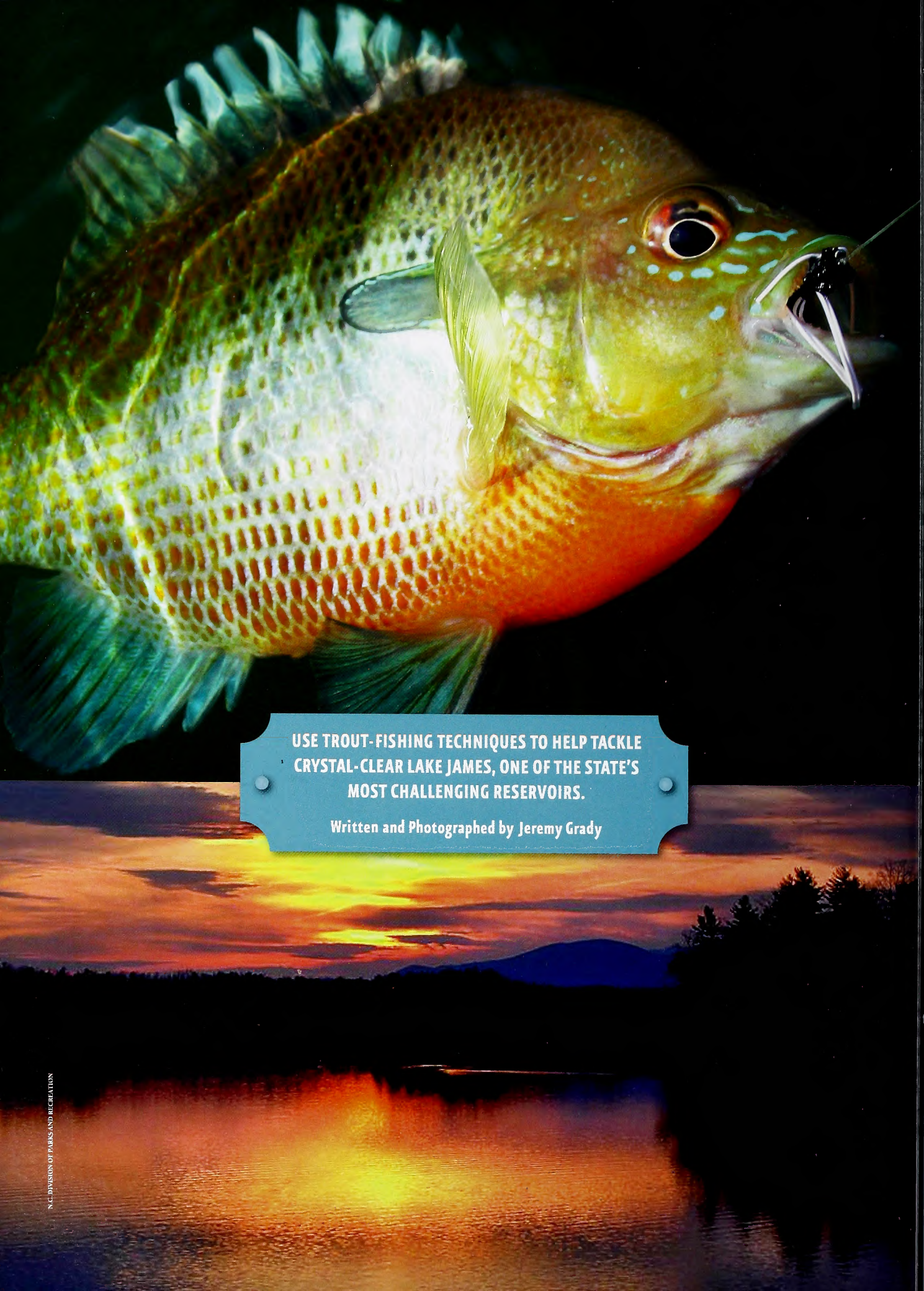
This is a common schooling species in shallow coastal waters of North Carolina. The unique shape of the head gives this species its name. Lookdowns are popular attractions at the North Carolina Aquariums.

BLACK DRUM (*Pogonias cromis*)

When caught, this fish will often release air from its swim bladder producing a loud drumming sound which gives this species its common name. Black drum are a much sought after game species that occupies the shallow coastal waters of North Carolina.

GAG (*Mycteroperca microlepis*)

The world record for this grouper was over 80 pounds. Off our coast, 10- to 20- pound fish are more common. It is a popular game fish and like most groupers, its meat is white and flaky and very delicious.



USE TROUT-FISHING TECHNIQUES TO HELP TACKLE CRYSTAL-CLEAR LAKE JAMES, ONE OF THE STATE'S MOST CHALLENGING RESERVOIRS.

Written and Photographed by Jeremy Grady

N.C. DIVISION OF PARKS AND RECREATION

FISHING THE DEAD SEA

S TALKING ON THE PHONE WITH MY BROTHER, JASON, ABOUT THE FISHING DAY HE HAD ON LAKE JAMES USING FLIES FOR SMALLMOUTH "WE NEED TO GO TO LAKE JAMES TOMORROW," HE SAID. "THEY'RE LY BITING . . . YOU'LL LOVE IT."

history fishing the old lake was hit-s. We knew the fish were there; we dn't have consistent luck catching Originally we had planned to go trout . Instead, the next morning we were lake casting woolly buggers toward nk for whatever would bite. As the ng went on, I continued to give Jason s looks. "Just keep fishing," he said. mething is going to have to happen I complained. "I don't want to spend off not catching anything." We still ough time left in the day to take the me and hike to a trout stream. continued to fish. Shortly, we decided nother bank that had a lot of timber d been blown down. As I was strip-e fly over some limbs, a brown fish ed out of nowhere and inhaled it. A ook set ensued, and the fish erupted ns and leaps in typical smallmouth hion. We quickly netted him. He was out 12 inches, but was a wildcat when . "See," Jason gloated. "I told you." he afternoon progressed, the fishing ed to be good. We got broken off by igger bass and eventually netted some up to 3 pounds, which really test your nerves on a small fly-rod. We also caught a couple of 2-pound largemouths, which was a real treat because those fish are so pretty in that clear water. Between the hook-ups from the bass, bluegills and redbreast sunfish began hitting the flies. We even landed a 10-inch shellcracker or redear sunfish.

All these fish were taken on flies out of Lake James? What a surprise.

Redbreast sunfish are a common catch on the fly in the clear waters of Lake James.

A New Mindset

That day marked the beginning of using the fly-rod on Lake James, and over time I've come to find out that Lake James is actually an excellent lake for anglers who like to use a fly-rod. I had fished the lake with my dad and brother up to my high school years. About the time I started driving, I got bit by the fly-fishing bug. That led to pursuing wild trout with dry flies. I had been away from Lake James for about 10 years. When I returned, I had a trout fisherman's mindset.

Lake James can be a challenge to fish. The locals don't refer to it as the Dead Sea for nothing. There have been days I've said prayers begging for a fish to bite. The lake was created by damming up the Linville River, the Catawba River and Paddys Creek, with a hydroelectric dam regulating water outflow to generate electricity. These are all trout streams creating a clear water lake, which can make for some difficult fishing. It's very common to see nice largemouth or smallmouth bass cruising around, and usually they will not hit anything.

Fly-fishing usually requires smaller tippets. Also, the fly lands softly, which is much more natural. And a fly offers lifelike movements that are unduplicated with conventional fishing tackle. Combine this with the fact that these fish have not seen many flies, and a fly-rodder has several unique advantages. I'm not saying that conventional methods don't work; I am saying that a fly gives an angler another very nice option to use when tackling Lake James.

The primary fly-rod target species are the ones Jason and I caught that fateful day: smallmouth bass, largemouth bass, bluegills and redbreast sunfish. If you can get a fly to a feeding fish, you can usually catch that fish. The trick is knowing when the fish will be in reach of a fly-fisherman.

How to Tackle James

My fly-fishing season usually starts about the middle of April; this is when the smallmouth bass start coming off the beds. At this time of year the fish are hungry, they're in shallow water so they can be reached, and they love flies. Streamers such as woolly buggers, zonkers, leaches and marabou minnows in sizes four and six are tough to beat. These soft breathing flies have a lot of action in the water, but to achieve this, you must fish them slowly. The slow, lifelike movements are irresistible to the fish.

I start looking for downed brush on the main channel, points and secondary points. I cast the fly out over the brush on the near side, and let it sink slowly. Because of the clear water, you can see just how fast to fish it. Strip it just fast enough to keep from getting hung up. If I don't get a take, I'll move with the trolling motor around the tree and aim my next cast over the middle of the brush pile. Once the fly is stripped over, I let it sink off the end. Some of the biggest smallmouths I've ever caught have come from these spots.

My last cast is on the other side of the brush. Again, fish it slowly, and once the fly clears the brush, let it sink. In the clear water, you can see when a fish comes up to eat it. This can sometimes be difficult because you see a nice bass begin to engulf the fly, and you want to set the hook like it's a tarpon. Try to let the fish close its mouth on the fly, then follow with a short, quick hook set, and hang on.

My primary fly-rod outfit for spring smallmouth is a 9-foot six-weight. I have a floating fly line with a 9-foot leader tapering to an 8-pound tippet. When hooked, these fish like to go back into the brush, and I do all I can to prevent that by using side pressure. Usually, if I can steer the fish away from the brush, into open water, I can wear it down. This does not always happen, and sometimes break-offs still occur. The smallmouths tend to stay shallow until mid-May, and then they start to migrate to deeper water. But a few stay shallow, and occasionally one will show up in the hottest part of the summer when you least expect it.

About this time of year you start seeing bluegills and redbreast sunfish. They move into shallower water looking for spawning areas. I keep three fly rods rigged up and ready at all times because I don't want to miss out on some nice panfish. The 9-foot six-weight has a No. 4 wooly bugger tied on. An 8-foot five-weight has a No. 8 woolly bugger tied on. The third fly-rod is also an 8-foot five-weight with a small popping bug, a chenille spider dropper.

Many times while using the bigger fly for bass, I've caught some huge panfish. Or I've moved into a particular piece of water where, over the years, I've caught some nice panfish, and I'll switch to the smaller woolly bugger. This is a fly for both bass and panfish. It

LAKE JAMES IS KNOWN FOR HAVING BIG BLUEGILLS, CATCHING THEM OVER 8 INCHES IS COMMON, AND THERE'S NO MORE ENJOYABLE WAY TO DO IT THAN WITH A FLY-ROD.

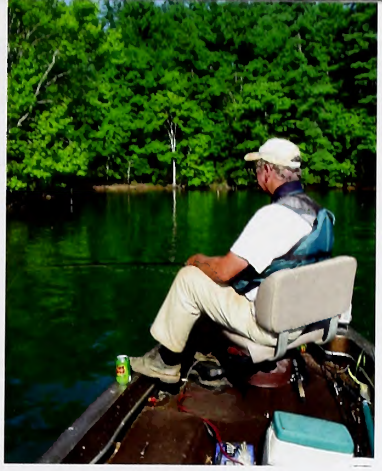
MELISSA McGAW/NCWRC

A variety of fish are available to Lake James anglers who choose to use a fly-rod, including (clockwise from top left) smallmouth bass, largemouth bass, redbreast sunfish and bluegills.

ails—whenever I do this it seems like
und smallmouth comes from nowhere
atches it. Unfortunately, you may not
nough tissue inside the mouth with
aller fly, and they get off. Sometimes
land them, and sometimes you just
opportunity to wrestle one.

ertime's Fine for Panfish

probably the best fly-fishing month
ıfish. You can pursue these fish the
summer, but June into mid-July is
time. As for maximum panfish action,
ı the calendar for the week of the full
Fish spawn during the full moon of
ıne and July, but over the years I've
the full moon in June to be hot for
ls and redbreast. The techniques of fly-
for these panfish are pretty much the
he differences lie in how they spawn.
e James is known for having big blue-
atching them over 8 inches is common,
ere's no more enjoyable way to do it
ith a fly-rod. To be honest, if I had
ice of catching a bass, trout or blue-
he same weight, unquestionably the
l would be my pick.
in, an angler can use the clear water
dvantage by looking for beds. I've
eds on points, secondary points,
f coves, nooks in coves, and some-
round nothing at all. Bluegill beds
ally deeper, sometimes as deep as 15
ey appear as dark, basketball-sized
n clusters of three to a dozen or so. For
mes, you can have good fly-fishing if
s are 4–6 feet deep.
t fly-anglers know about using small
g bugs for panfish, and there may not
re fun way of catching them. All you
e some chartreuse, yellow or white
g bugs, size 8 or 10, and they must
bber legs. Rubber legs on a popping
ve panfish crazy! If they get torn off
a day of fishing, I clip off the bug and
new one. I like the size 8 over a 10
it keeps the smaller fish away. Also,
er a bass sips it, you have a better
for a solid hookup.
e bluegill beds are deeper, the fish
ıot come to the surface for a popping
u might have to use some sort of wet
will slowly sink to entice a strike.
the time to get a little nasty, so tie on
er. I use the same system for trout by



NATURE'S WAYS
Why Are Some Lakes Clear While Others Are Murky?
See Nature's Ways, page 39.

attaching an 18-inch piece of 8-pound tippet to the eye of the popper. At the other end, knot a wet fly such as a No. 10 hard body black ant or No. 10 black chenille spider. The popper acts like a strike indicator, the spider has rubber legs, and aggressive bluegills can't resist it when it's dangled above their beds.

Cast to a cluster of beds from outer to inner, similar to approaching a pool of a trout stream from the back to the front. A hooked bluegill fighting over a set of beds tends to spook the others. Also, if you make a cast in the middle of the beds, you run the risk of having three or four nice bluegills come up at once and not hooking any of them. So cast the fly to the outermost edges: Many times they'll still come up to eat the flies, and doubles are very common. With each following cast, throw farther and farther over the beds, until you've covered them thoroughly. Try to get each fish out quickly; this will increase the odds for more hookups.

Redbreast sunfish, also known as robins, are a different breed altogether. There aren't many freshwater fish more aggressive than the redbreast. And the colors are astounding! With the reddish orange breast, rich brown back and blue-aqua sides, the colors resemble a tropical reef fish.

Redbreast beds are different. They're usually in shallower water, 1–3 feet deep. These beds aren't in clusters, they're spread out sporadically, usually along the red clay banks that Lake James is known for. Redbreasts guarding beds are spooky, though. They put you in mind of a wary Wilson Creek brown trout. If you place the fly directly over the bed, they'll bolt. To catch them, take advantage of their aggressiveness by placing the fly a couple feet in front of or to the side of the bed. Let the fly sit, allow the legs to move, and the fish will come and eat it.

Bass bonanza

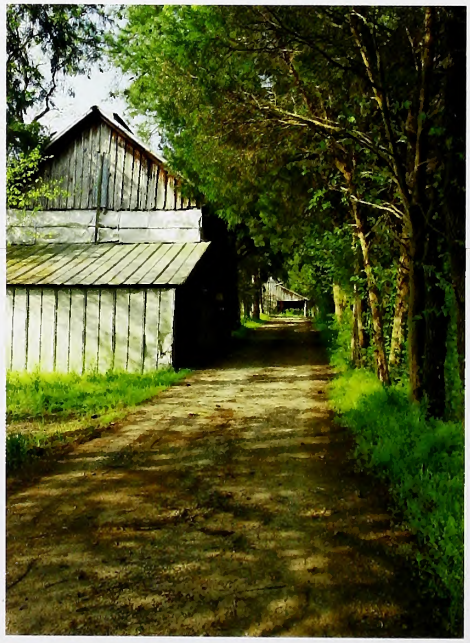
We catch a few largemouth bass earlier in the spring fishing for smallmouths, but June is probably the best surface fly-rodding month for them. Cork bugs will catch bass, but deer hair bugs just seem to have a little more lifelike movement, and bass love them. I don't think that color really matters—frogs, fruit cocktails and mouse imitations all work. Again, bugs with rubber legs, and soft hackle feathers are more lifelike. I like a size six. This is the perfect-sized morsel for a largemouth, and it'll catch some of the biggest redbreast sunfish in the lake.

The key points to bass bug fishing are location, retrieve and time of day. My best luck has come fishing the bugs in what I call "special places." Usually, while fly-fishing for bluegills along a bank, whenever I come to a place that looks like it might hold a bass, I pick up the bug. Backs of coves, nooks or any kind of brush are good places to start. June is usually hotter, so early in the morning and later in the evening tends to be better.

Sometimes a largemouth will hit the bug as soon as it hits the water. If it doesn't, let the bug sit still for up to 10 seconds. While the bug is sitting there, the legs and hackles are breathing, and this is tantalizing. Then move it about 4 or 5 inches, and let it sit for five seconds or so. Repeat this until the bug has cleared the structure. This may seem like slow fishing, but unlike winding a lure all the way to the boat, just pick up the bug and cast it to the next spot. Most of my bass bugging is done with a 9-foot, seven-weight fly rod with a leader about the length of the rod, tapering to 10 pounds.

Lake James can be tough to fish, but you can catch something from spring to fall with flies. One of the nice things about fly-fishing Lake James is that you really don't know what you're going to catch. You can be throwing small poppers for redbreast, and a 3-pound smallmouth appears from nowhere and inhales it. But that's why I love fishing. ◆

Jeremy Grady is a writer from Morganton and a regular contributor to WINC.



'LC focuses not only on pristine natural such as Fisher Peak in Surry County, armland and urban natural areas. Part e work of volunteers such as Doug arest (left) is removing invasive plants natural areas.

PROTECTING THE *piedmont*

The Piedmont Land Conservancy is working diligently – and successfully – to conserve farmland, open space and access to public land in the geographic center of North Carolina.

WRITTEN BY KATHY NORCROSS WATTS
PHOTOGRAPHED BY MELISSA McGAW

Piedmont Land Conservancy's conservation efforts stretch across nine counties, from Guy Troy's tree farm in Randolph County to Price Park, just 10 minutes from downtown Greensboro. They've helped protect historic Bethania outside Winston-Salem and the pristine Fisher Peak wilderness in Surry County. In its first 20 years, PLC has leveraged tens of millions of dollars to protect 17,700 acres.

"It's a good start," says Ken Bridle, stewardship director for PLC and vice-chair of the Nongame Wildlife Advisory Committee of the N.C. Wildlife Resources Commission.

However, the self-described "old-school naturalist" is quick to add, "There's no sitting on our laurels. We have our work cut out for us. The ecology can only stand so much stress before things collapse."

PLC'S Roots

In 1990, Kathy Treanor and others who shared her concerns about preserving the Piedmont's natural areas incorporated Piedmont Land Conservancy as a tax-exempt nonprofit 501 (c)(3) organization. Treanor, PLC's founder and first executive director, was "as determined an individual as I've ever seen," says Carolyn Allen, who served on the first board of directors and is PLC's immediate past president.

"We have worked on conserving farmlands, open spaces and access to public spaces as well as private lands," Allen says. "I am amazed at the amount of land protection that has occurred."

PLC staff members tailor protection plans to meet the landowners' goals for their property. "From our founding until 2000, we had to go out and educate landowners about what we are doing and try to sell our program," says Kevin Redding, PLC's current executive director. "In the last eight to nine years, we get more phone calls than we can handle. We only work with willing landowners who want to work with us."

And he says it's important for landowners to understand that when they work with PLC, "It doesn't mean you have to grant access."

Guy Troy and PLC executive director Kevin Redding (white shirt) discuss Troy's longleaf pine plantings and his plans for his Randolph County farm.

The conservancy has four preservation focus areas: urban natural areas, farmland, natural heritage and water resources. Each of its projects preserves one or more of these targets, and they cluster projects when possible in order to have a bigger impact. PLC staff and board members recognize that a key piece of preservation is education. They offer regular field trips to their projects as well as other natural areas.

North Carolina's population is forecast to grow by 4 to 5 million people in the next 25 years, and Redding understands why: "Where else would you want to live?"

But he cautions, "We're going to love it to death if we don't take care of it."

Fisher Peak and Water Quality

PLC's service area includes the headwaters of several rivers that provide drinking water to communities downstream. Fisher Peak's watershed eventually goes to the Yadkin River, Winston-Salem's water supply. The Deep River is a tributary of the Randleman Reservoir.

"From a water quality and water quantity standpoint, there are a lot of people who should be interested in what kind of conservation's happening in this area," Redding notes. Many of the Conservancy's projects are low profile, but Fisher Peak is different. When you talk to just about anyone in Surry County, "The entire community knows what Fisher Peak is," he says.

The area has long-range views of the Fisher River watershed and the Mitchell River watershed, says Bern B. Schumak, Western Piedmont and Northern Mountains Field Representative for North Carolina's Clean Water Management Trust Fund (CWMTF). "It's a real undiscovered gem," he says. "Most people who see it can't believe it is only an hour or so fro Winston-Salem and the Triad."

Two or three years ago, acquiring a permanently protecting Fisher Peak for citizens of the state was only a dream of be four to five people, Schumak says. "P took the initiative to work with proper owners and to start a private fundraisi drive," he explains. "When the first tr became available, PLC somewhat went on a limb putting it under option." So PLC has protected 771 acres in Fisher P

"Acquiring and permanently preserv the 1,700-acre Fisher Peak Natural Area protect approximately 100,000 linear fe stream, which provides habitat for trou other coldwater aquatic species," Schum continues. "Being linked to the Blue Ri Parkway will also provide a large green corridor that will allow for unique hiking recreation activities."

In 2003, Schumak and his wife, Ell donated a conservation easement on th farm along the Mitchell River. "We want teach our children what it means to be g stewards of the land, and we also wante pass something on to them that we kn won't change and will always be protect Schumak writes in PLC's publication "Forever These Lands."

One of the conservancy's strengths finding partners, both private and publi support its protection efforts. CWMTF partnered with PLC frequently, Schumak Typically PLC has raised about 50 perce of the cost through private fundraising. C state and federal programs have also co buted, and CWMTF has assisted with chasing the riparian buffers.

"CWMTF and PLC have a long histo and have been partners since our progr was formed in 1996," Schumak says. "O CWMTF's first grants was to PLC to pur and protect Saddle Mountain, which fo the headwaters to the Mitchell River.... people don't realize the great work PLC other land trusts are doing to protect the resources for current and future generatio

Focusing on Farmland

Guy Troy's grandfather left his 190-ye old family farm in Randolph County to grandchildren before they were born, a Troy felt a responsibility to continue t legacy. "It's always been very close to m heart," says Troy, a retired Colonel in t U.S. Army. "I wanted to make sure it sta in the family."

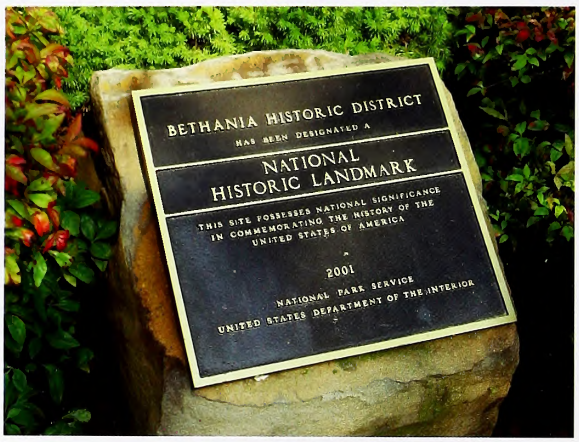
2001, Troy donated the development
s on 304.71 acres on his farm, which
'LC's second easement in the Liberty-
leman Farmland Protection Corridor.
ıltivates approximately 30 acres of the
and he plants 140 acres in loblolly and
eaf pines as part of a sustainable forest
ıgement plan. The rest remains natural
. His plan allows for some homes for
y members, and a small hunting club
an eye on the farm for him. He intends
nt vegetation to provide wildlife habitat,
ıcularly for quail and turkeys.
Ve try to tailor the conservation ease-
to whatever goals the homeowner has
eir property," Redding says.
ensure that his farm remains in his
y, Troy also incorporated and gave his
ons each a 24 percent share; he controls
st, which they will eventually inherit.
ing appreciates that Troy, a respected
ber of the community, has shared his
with his neighbors and encouraged
farmers to follow his lead. "They've
a wonderful job protecting our farm-
" Troy says.
proximately 70 to 80 farmers are wait-
ı line to do just that, Bridle says, but
isn't funding available to support them.
farmers' assets are tied to the land, and
their income comes from the land. Reducing property taxes often isn't enough to enable them to donate development rights.

"It's critical now to preserve farmland," Bridle explains. As fuel prices are rising, people are recognizing it's more efficient and healthier to buy local food. Clustering projects, particularly in farmland tracts, will provide benefits to future farming efforts as demand for local produce increases. Another goal is to keep infrastructure in place for these farming operations, such as Hickory Grove Dairy in Alamance County. In order to have farmland available when communities realize the necessity of using local produce, Bridle says, "We need to preserve the farmland that will do that."

North Carolina's population is forecast to grow by 4 to 5 million people in the next 25 years, and Redding understands why: "Where else would you want to live?"

Natural Heritage Enhanced

Bethania, located on the outskirts of Winston-Salem, is a 1759 Moravian community that has been designated a National Historic Landmark. It represents the European-style agricultural village in which the homes are clustered in the center and surrounded by farm fields and orchards.



Near historic Bethania, (left to right, top right photo) Ken Bridle, Doug Demarest and Shelley Rutkin plant a swamp rose. In Greensboro, (opposite page), Dennis Burnette (left) leads members of the Triad Chapter of the Carolina Butterfly Society on a walk through Price Park.

Through seven different projects to date, the town has been able to preserve 151 acres in and around Bethania, Mayor Deborah Stoltz-Thompson says. The efforts preserve the viewshed as well as the Black Walnut Bottom Trail, which holds some native plants and provides habitat for wildlife.

The Audubon Society of Forsyth County is working with Bridle and the town to preserve the natural state of the habitat by removing invasive plant species such as multiflora rose, English ivy and Japanese honeysuckle, and by reintroducing native species that will attract wildlife.

"Audubon's main issue is conservation," says Shelley Rutkin, who is a member of PLC and treasurer of the Forsyth Audubon group. The members have planted native trees, such as the fringe tree and redbud, and shrubs including the New Jersey tea, Carolina allspice, wild plums and beautyberry that will benefit birds and butterflies. Wood thrushes, pileated woodpeckers, indigo buntings, common yellowthroats, Eastern towhees, Eastern bluebirds, blue-gray gnatcatchers and great-crested flycatchers already thrive in Bethania.

"Nobody's going to bring back a passenger pigeon," Rutkin says. "We don't want to lose any more species. The answer to all of this is habitat protection."

"It all works together, "PLC is so important: they are our main local environmental organization. I think they've had a tremendous impact on this part of North Carolina."

A community's urban natural

Just 10 minutes from downtown Greens sits the 98-acre Price Park, which hol the Kathleen Clay Edwards Family Bra Library. "It's the most used library in Gr boro," according to Melanie Buckingha the library's Environmental Resources Librarian. Families pack a lunch and w the trails. "People come here and make a of it. It's a destination for folks; it's a grea for flora and fauna. It's accessible to peo

The library is listed as an Environm Education Center by the state Office of E ronmental Education, and it has an exte collection of nature, gardening and env mental resources. It offers intergenerati gardening programs and has backpacks hold educational, fun activities for chi to teach them about nature when they there. Located on land previously owne Jefferson Pilot, the library is named af Kathleen Clay Bryan Edwards, who do $2.5 million to Piedmont Land Conserv to protect Price Park. The Kathleen Pric Bryan Family Fund contributed $1 mill and the Greensboro City Council con- tributed $250,000 to complete the purc

Two misguided snakes have made th way into the library, and staff escorted t out. Nearby Jefferson Elementary Sch teachers and students "take full use of park," Buckingham says. In late summ 2009, students observed PLC's prescrib burn of a section of the Meadowlark Sa tuary, part of its efforts to develop Piedm Prairie habitat. Eagle Scouts have built s a rain garden and provided benches.

gional Parks Superintendent Steve
on says that PLC has been invaluable
Price Park project. With no staff on
ther than those in the library, Bridle
ne city know what's going wrong and
's going right, he says. "Ken's our eyes
ars," Branson says.
ne N.C. Wetlands Restoration Program,
redecessor to the N.C. Division of Envi-
ent and Natural Resources' Ecosystem
ncement Program (EEP), developed a
n restoration project in Price Park on
pper tributary to Horsepen Creek,
ding to Greg Melia, Stream Monitoring
alist for EEP. The site was planted with
e trees, shrubs and grasses, and the
r has grown quite dense, he says A wet-
was also planted and enhanced as part
project.
have been told that local birding groups
his project because the high rush and
that exist in the wetland combined
the early successional forested areas
provide a diversity of habitat types
provide good opportunities for bird-
ners," Melia adds.
he T. Gilbert Pearson Chapter of the
bon Society has taken on several pro-
Dennis Burnette is project coordinator
23-acre Meadowlark Sanctuary Pied-
Prairie Project and past president
T. Gilbert Pearson Chapter of the
bon Society.

"We have noted Eastern meadowlarks, a declining bird species, in the meadow, and we're trying to encourage the species to stay," Burnette says. "Using grants, we are introducing native plants that will improve the habitat for wildlife. We've already put in several species of plants to help butterflies. In addition, we have constructed a nesting tower in the meadow for chimney swifts, another declining bird species, as well as installing several nest boxes to support Eastern bluebirds and other species. We are cooperating with PLC on the project, although the group is separate from PLC."

With Bridle's direction, the group is also clearing out successional vegetation, such as hardwood trees, in order to maintain the wet meadow environment, says Craig Lawrence, co-chair of the T. Gilbert Pearson Chapter.

Many other groups have contributed to the success of Price Park: the Triad chapter of the Carolina Butterfly Society is providing information about native butterfly host plants and nectar sources and led the effort to have the site designated as an official Monarch Way Station, Burnette says. The N.C. Native Plant Society awarded a grant of $500 to assist with initial site preparation and purchasing native plant seeds, and the Piedmont Bird Club has awarded a grant of $600 for seed and signs.

"The whole community is very invested in it," Buckingham says.

The Piedmont's Future

With North Carolina's population forecast to grow by 4 to 5 million people in the next 25 years, PLC's preservation efforts are needed now more than ever.

"As the years have gone by, the awareness has grown across the state of things like population growth, and deteriorating air quality and water quality have impacted communities," says Allen, who served as mayor of Greensboro from 1993 to 1999. She believes people are recognizing the value of organizations like PLC.

"Seventy-five percent of the land in North Carolina is owned by people over 65 years old," Redding says. "All this land's going to change hands in the next 20 years." Farmland preservation is a priority, he says, as is saving the natural areas of the Piedmont. "A million and a half people live in our nine counties. They need to be able to get to a park."

In Redding's hometown, development has occurred that would prevent his children from having the same kind of childhood that he had, and he's concerned. "There could be a generation they don't even know how to catch a crawdad," he says. "We want to keep two-line salamanders in creeks. Kids should be able to see a box turtle." ◆

Kathy Norcross Watts writes from her farm in Germanton. She is an occasional contributor to WINC.

SUMMERTIME,
and the boating is easy

Have fun and be safe on the water at the height of the boating season.

written by Geoff Cantrell

A breeze comes across the bow, cool or at least cooler by comparison. The steady slap of water against the hull is hypnotic. This is boating or maybe this is fishing from a boat, or a prelude to a nap. Whatever it is, well, it's just about perfect. Being here, in the middle of summer on the corner of a lake somewhere in North Carolina and the rest of the world and its troubles are so far away.

The churn of an outboard approaches, then quickly switches off and the earlier idyllic moment is interrupted by a loud but friendly greeting.

"Good afternoon," the voice says, the approaching boat gliding ongside. "This is a routine vessel safety inspection."

A moment to focus and a flicker of recognition of a uniform, then has my full attention. He states his name and rank.

"I'm with the Wildlife Resources Commission."

His patrol boat is a center console with blue lights, marked with oad and narrow bands of green angled forward, a black-and-gold amond logo and block letters reading "WILDLIFE OFFICER." He iles as I set the fishing rod down.

"How are you doing today? How's fishing?"

My sportsman license and driver's license are already out.

"Do you mind if I look in your cooler?"

Go right ahead: Plenty of bottled water and soft drinks, a couple ers and a lot of melting ice.

"I notice you have a couple of beers there. Have you been drinkg?" Not yet. "Well, be advised that North Carolina sets the same nit for intoxication while operating a boat as it does for driving ur car on the road, a .08 blood alcohol concentration. And on a at you can be charged if you are appreciably impaired."

He explains boater fatigue, where factors such as wind and waves, mbined with heat, motor noise and vibrations, along with glare and at movement can magnify the effects of alcohol up to three times some individuals. The beers can wait until I get home.

"Now, I need to check your title and registration, and let me see ur... fire extinguisher... throwable flotation device... and life vests r everyone on board."

It is legally enough for me to have a life vest at hand, but children unger than 13 must wear an appropriate U.S. Coast Guard-approved e vest on a recreational vessel that is underway. Anyone on a pernal watercraft or being towed by one must wear an approved life st. Wearing a personal flotation device makes sense, because accints happen fast and the delay of trying to put one on while in the ater could prove costly. And it sets a good example for kids.

It doesn't apply to me, but the officer thought it was worth noting at anyone younger than 26 operating a vessel—johnboat, jet ski, ntoon boat, whatever—powered by a motor of 10 horsepower or eater on public waterways must have successfully completed an proved boating safety education course or otherwise be in comiance with a law that went into effect May 1, 2010. Thinking about unger members of the family, I ask for more information and he nds me a brochure.

"The Wildlife Resources Commission holds courses free of charge ross the state, I teach it regularly, and you can check schedules at ww.ncwildlife.org," he explains, adding that there are other course oviders, including online classes, which can have a fee.

The outboard fires back to life, he wishes me luck fishing and a fe return to shore. The exchange has taken maybe five minutes, obably less, to know the boat and the boater are safe and legal. ◆

Zoff Cantrell is a public information officer with the N.C. Wildlife sources Commission.

A priority of the commission's Enforcement officers is for all boaters to be safe on the water.

PHOTOGRAPHS BY MELISSA McGAW/NCWRC

Boating accidents on public waterways must be reported to the N.C. Wildlife Resources Commission (available 24 hours a day by calling 1-800-662-7137) when one or more of the following conditions occurs:

- Loss of life; an injury requiring medical treatment; a person rendered unconscious; a person left disabled for 24 hours or longer
- Actual physical damage to property, including vessels, is in excess of $2,000
- A person disappears from the vessel under circumstances that indicate death or injury.

Wildlife Officers are charged with enforcing the boating laws and regulations on the public waters of the state, and routinely stop vessels for safety checks or violations. The aim of this enforcement is always safety.

For more information on recreational boating education courses, regulations and requirements visit www.ncwildlife.org or call (919) 707-0031.

THE NEW *Legends*

MEET FOUR HIGHLY ACCOMPLISHED NORTH CAROLINA FLY-FISI
GUIDES WHO HAVE BECOME LEGENDARY IN THEIR OWN TIME.

WRITTEN BY MARTY SHAFFNER PHOTOGRAPHED BY MELISSA Mc

The Wildlife Endowment Fund

An Investment for the Future

Established in 1981, the Wildlife Endowment Fund allows the Wildlife Resources Commission to accept tax-deductible contributions for wildlife conservation. Money from the sale of lifetime licenses is also placed in this fund. Your donation or purchase will ensure that North Carolina will have a rich wildlife heritage for generations to come.

Lifetime License Form

Infant and Youth *(check appropriate block)*:

- ☐ Sportsman Infant $200
  (under 1 year old—Applicotion must be received before opplicont has ottained 1 year af age.)
- ☐ Unified Sportsman/Coastal Recreational Fishing Infant $275
  (under 1 yeor old—Applicatian must be received before applicont hos ottoined 1 year af oge.)
- ☐ Sportsman Youth $350
  (ages 1 through 11—Application must be received before applicant hos attained 12 years af age.)
- ☐ Unified Sportsman/Coastal Recreational Fishing Youth $450
  (ogès 1 through 11—Applicotian must be received before applicant hos ottoined 12 years af oge.)

A copy of the birth certificate must accompany applications for infant and youth licenses. Birth certificate documentation cannot be returned.

Note: Pending satisfactory completion of the hunter safety course, persons who possess infant or youth licenses may exercise the privileges thereof when accompanied by an adult who is properly licensed to hunt in North Carolina. "Accompanied" is defined as maintaining a proximity to the hunter which enables the adult to monitor the activities of, and communicate with, the hunter at all times.

Adult (age 12 or older) *(check appropriate block)*:

- ☐ Comprehensive Inland Fishing. $250
  (N.C. residents only—includes bosic inlond fishing, trout & traut waters on game lands)
- ☐ Comprehensive Hunting. $250
  (N.C. residents only—includes bosic hunting, big game, game lands & N.C. woterfawl)
- ☐ Sportsman. $500
  (N.C. residents only oge 12 ar alder—includes basic hunting & inland fishing, big game, game lands, trout & N.C. woterfawl)
- ☐ Coastal Recreational Fishing $250
  (N.C. residents only—includes coastal recreotional fishing)
- ☐ Unified Sportsman/Coastal Recreational Fishing $675
  (N.C. residents anly—includes same privileges as the Spartsman, plus coostal recreationol fishing)

A federal waterfowl stamp must be purchased separately for all N.C. hunting licenses.

Note: On or after July 1, 1991, a person, regardless of age, may not procure a hunting license or hunt in North Carolina without producing a certificate of competency for completing the hunter safety course or a hunting license effective prior to July 1, 1991, or by signing the statement below that he or she had such a license.

Check appropriate block and attach required copy:

- ☐ Copy of Prior Year Hunting License
- ☐ Copy of Hunter Safety Certificate of Competence
- ☐ In lieu of copy, I am signing the statement below:

Statement: I certify that I was a licensed hunter prior to July 1, 1991.

Signature _____ Date _____

Visit us online at www.ncwildlife.org or call 1-888-248-6834 for a complete list of lifetime licenses, including those for nonresidents and 65 and older.

Lifetime License

Complete the following information if applying for a lifetime license. Be sure to check appropriate block(s) on reverse side ***(please print legibly)*****:**

Name of Applicant_____

Daytime Phone _____

Mailing Address_____

Resident Address_____

County _____Date of Birth _____ Driver License # _____

E-mail Address_____

Is this license a gift? ☐ Yes ☐ No If yes, mail license to ☐ Donor or ☐ Applicant.

License Donor's Name *(if applicable)* _____

Donor's Telephone # _____

Donor's Mailing Address_____

City _____ State _____ Zip_____

Method of Payment: ☐ Check ☐ VISA ☐ MasterCard

Acct. #_____ Expires _____

Print name exactly as it appears on credit card _____

Cardholder's Signature_____ Date_____

Personalize your Lifetime License for an additional $5:
Indicate your selection of letters, numbers, dashes, periods, commas and /or blanks up to 6 spaces: ___ ___ ___ ___ ___ ___

Indicate your personal message including letters, numbers, dashes, periods, commas and /or blanks up to 21 spaces:

___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
___ ___ ___ ___ ___ ___ ___ ___ ___ ___

Signature of Applicant or Donor _____ Date_____

Note: Only adult lifetime licenses may be purchased by phone or online (VISA or MasterCard only). Call toll-free (1-888-248-6834) or visit us at www.ncwildlife.org. Use this form to purchase infant and youth lifetime licenses by mail.

Tax-Deductible Contribution

☐ I wish to make a tax-deductible contribution to the Wildlife Endowment Fund. Enclosed is my check for $_____. ***(Credit card payments cannot be accepted.)***

Name _____

Daytime Phone_____

Mailing Address _____

City _____ State_____ Zip _____

Make checks payable to: *Wildlife Endowment Fund*

Transactions are not considered final until the check has cleared the bank. Items purchased with a returned check will be made invalid. A service charge of up to $25 will be charged on any returned check. (N.C.G.S. 25-3-506)

Mail completed application and payment to:
NCWRC, License Section, 1707 Mail Service Center, Raleigh, NC 27699-1707

Office location: *NCSU Centennial Campus, 1751 Varsity Drive, Raleigh, N.C. 27606*
Telephone: 1-888-248-6834 (2HUNTFISH)

The majority of people who practice a trade or participate in a sport can do so for a lifetime without ever acquiring the skills to rise to the top of their field. A few will acquire those skills and hone them to a razor's edge to be among the best. A very, very few who rise to the top of their field will stand out even among those at the top of their game. These people become legendary for their skills and achievements and, often, for their personalities.

This article started out as an idea to get a few fishing guides to name their two favorite North Carolina trout flies—one a dry fly, one a subsurface fly. I reasoned that to make the article work, the people I asked needed to carry a little weight in the North Carolina fly-fishing community. As I compiled all their accomplishments and their longevity in the sport of fly-fishing, I realized that these gentlemen were legendary in our state's fly-fishing circles. The majority of fly-anglers in North Carolina either know these people or know of them. So this article turned into one more about the people than the flies. Many years from now when people speak of noted North Carolina fly-fishermen such as Mark Cathey and Fred Hall, you can bet some of these gentlemen will be included in the conversation.

I am proud to say that I have gotten to know three of these gentlemen over the years, and they are counted among my friends. I have worked with these men on more than one occasion and they have always conducted themselves in a fair and professional manner. The other gentleman's reputation precedes him in a good way. All of these men have many achievements to their credit, but they all share two things: they're just plain great guys and are respected by others in their field. That speaks volumes, because the respect of your peers is one of the hardest things to earn.

BO'S fun-loving personality and desire to teach others has made him a fly-fishing icon in the state of North Carolina.

Bo Cash sometimes ties on his version of an Elk Hair caddis, the Cash caddis, when fishing streams such as Upper Creek.

Bo Cash

William "Bo" Cash was born in Morganton and still lives a short distance away, on top of a wooded ridge looking out at Table Rock Mountain. Bo taught biology, ecology and general science at schools in Cleveland and Burke counties for 28 years, which is a great legacy in itself, but Bo is better known for being a teacher of fly-fishing. He has engaged in many outdoor activities during his lifetime, but fly-fishing has been his passion from a young age. Bo cast his first fly rod at the tender age of 8, which led to a steady progression in the sport from fly-fishing, to fly-tying, to rod building and finally to opening a fly shop he still operates, Table Rock Angler.

Bo has always given back to the sport way more than he has taken. His achievements include having been vice president and president of his local Trout Unlimited chapter, Table Rock TU, and he remains on the chapter's board of directors. He has served as treasurer and vice chairman of the N.C. Trout Unlimited council as well as being associate editor of the state TU newspaper. Bo has volunteered on many stream projects for TU, the N.C. Wildlife Resources Commission and the U.S. Forest Service, along with serving as an adviser to the Wildlife Commission from 1987 to 1989.

With all of Bo's accomplishments, his greatest, in my opinion, has been as an ambassador for the sport of fly-fishing statewide. Bo has introduced countless individuals to fly-fishing and helped many others improve their skills. Bo's fun-loving personality and desire to teach others has made him a fishing icon in the state of North Caroli don't think I have ever been in a group fishermen anywhere in the state without one knowing Bo Cash, and they have al had nothing but good things to say abo him. That's a legacy that speaks for itse

Q: IF YOU COULD HAVE ONLY ONE DRY FLY ONE WET FLY TO FISH NORTH CAROLINA STRE WHAT WOULD THEY BE?

A: An Elk Hair caddis would definitely be m fly and probably my own variation of a G Ribbed Hare's Ear nymph would be my wet

Q: WHAT IS YOUR FAVORITE PLACE TO FISH TROUT IN NORTH CAROLINA?

A: Any of the many small wild trout stream North Carolina has, especially those with g sections. I love to fish the plunge pools and p water that are created by the rapidly falling in these beautiful, uncrowded places.

Q: WHAT IS YOUR FAVORITE SPECIES OF FIS PURSUE WITH THE FLY-ROD?

A: Native Appalachian brook trout. They jus a special place in my heart.

Q: IF YOU COULD SHARE ONE PIECE OF ADVICE OUR READERS THAT YOU THINK WOULD IM THE AVERAGE FLY-FISHERMAN'S ON-STREAM CESS, WHAT WOULD IT BE?

A: To learn to better read the water. I see many people fishing the wrong water or fis water unlikely to hold fish. Most of the t your first cast is your best chance at gettin bite, especially on small streams. If your f cast is presented in the right spot it ups odds tremendously.

Kevin Howell

Saying that Kevin Howell's father, hims legend in North Carolina fly-fishing, gave a pretty good foundation in the sport w be a huge understatement. By the time h left for college, he had fished in 38 state two foreign countries. After graduating Appalachian State University, Kevin retu to the Brevard area and was first a teache

after earning a master's degree in engi-
ng, began designing houses. In 1997 he
ffered the job as manager of Davidson
Outfitters (DRO), a job he just couldn't
up.

ith the passing of his father, Don Howell,
98, Kevin took over the operation of
ht and Don's Custom Tackle, a business
d by his father and uncle. He continued
nage Davidson River Outfitters, basically
ng both businesses. In 2000, Kevin was
o purchase DRO, and he combined the
perations under the Davidson River
tters name. Since then, he has turned it
ne of the leading fly shops and outfit-
n the state.

addition to Kevin, who has been guiding
the early 1980s, DRO has several other
s working out of his shop and stocks a
ne of quality tackle for the fly-fisherman.
dition to being a Federation of Fly-Fisher-
ertified casting instructor and nationally
n fly-tier, in 1999 he released a book
d "Tying and Fishing Appalachian Trout
documenting his family's fly patterns
heir important part in the history of
n Carolina fly-fishing.

nd if all this wasn't enough, in 2005 he
d third in the "Fly Fishing Masters" a
nal fly-fishing tournament televised by
is now the Versus cable channel. Then
ned around and won the tournament in
Kevin showed that you don't have to live
f the Mississippi or north of the Mason-
n line to be a great trout fisherman.

**OU COULD HAVE ONLY ONE DRY FLY AND
ET FLY TO FISH NORTH CAROLINA STREAMS,
WOULD THEY BE?**

favorite dry fly would be the Yellow Mayfly,
Appalachian pattern. As far as a subsurface
would have to be one of my own patterns,
vin's Stonefly .

**AT IS YOUR FAVORITE PLACE TO FISH FOR
IN NORTH CAROLINA?**

home waters, the Davidson River.

**AT IS YOUR FAVORITE SPECIES OF FISH TO
E WITH THE FLY-ROD?**

allmouth bass. I love fishing the French
for smallies.

**OU COULD SHARE ONE PIECE OF ADVICE WITH
EADERS THAT YOU THINK WOULD IMPROVE
ERAGE FLY-FISHERMAN'S ON-STREAM SUC-
WHAT WOULD IT BE?**

ave to say two things that go had in hand
and that is when nymphing, not getting a drag-free drift and not getting the nymph down deep enough. You have to learn how to mend your line correctly to get a drag-free drift, and most people don't use enough split shot or a heavy enough fly to get down on the bottom where most of the fish are.

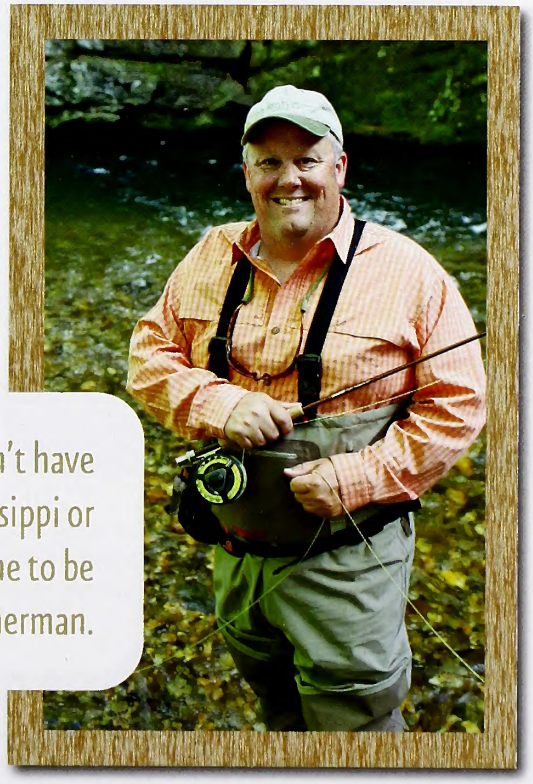
Roger Lowe

The great Smoky Mountains of North Carolina is an area famous for its trout fishing and trout fishermen. Roger Lowe grew up in Waynesville, in the heart of the Smokies. He spent his childhood fishing and camping on the streams that course their way down the steep grades of these mountains. Roger learned the art of fly fishing from his father and grandfather, both master fly-fishermen in their own right.

A guide in the Smokies for more than two decades and former owner of Lowe's Fly Shop in Waynesville for many years, it is as a fly-tier that Roger is most famous. To watch him at the tying vise is to truly watch an artist at work — he is a master tier. I once watched Roger at a TU meeting demonstrate how to tie a Quill Gordon, a dry fly with split-wood duck wings and a quill body, a very hard fly to tie for most people. Not only did he tie them with the ease and speed that only a true expert can, they were some of the best proportioned and most beautiful flies I've ever seen. Although Roger has many original fly patterns to his credit, he is probably most famous for keeping the old Smoky Mountain fly patterns alive. In a day and age where everyone is looking for a newer and better fly, Roger has reminded us that those old patterns were standards for a reason: They caught fish and they still do!

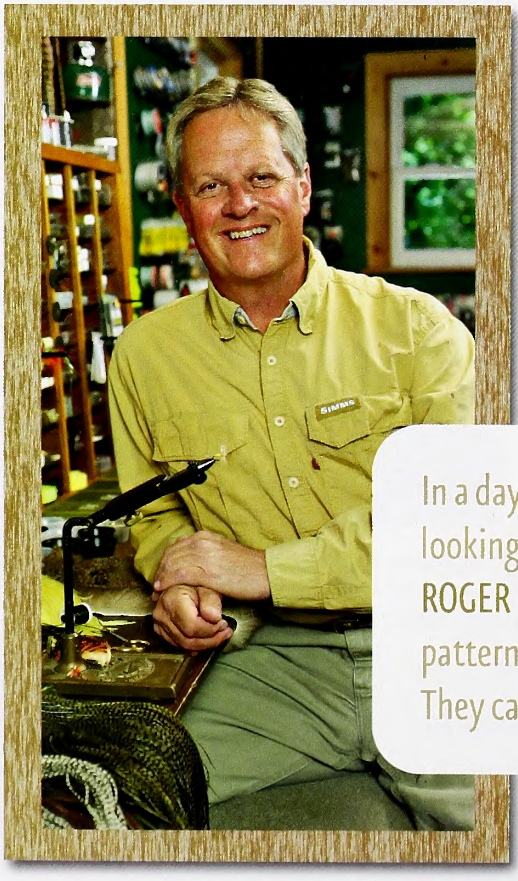
Roger is also a top-notch businessman with a laid-back style and a confident, easy-going personality. He has written two books on tying the old Smoky Mountain fly patterns

Kevin Howell prefers his own creation, a Kevin's Stonefly, as a subsurface fly on rivers such as the Davidson.



KEVIN showed that you don't have to live west of the Mississippi or north of the Mason-Dixon line to be a great trout fisherman.

Noted tier Roger Lowe displays a
Gordon (left) and his favorite dr
Yellow Mayfly (below).



that his father and grandfather taught him, as well as his own original patterns. Roger also has a DVD on fly-tying, showing step by step how he ties some of those same patterns. He was featured on and tied the flies for the poster "Traditional Trout Flies of the Southern Appalachians," published by the Wildlife Commission.

Roger carved out a niche in the fly-fishing business world and has been very successful, but he recently has cut back on guiding to pursue other business opportunities. Roger is at heart just a good old country boy from Waynesville who loves to fly-fish and tie flies. It just so happens that he is one of the best in the state at both.

Q: IF YOU COULD HAVE ONLY ONE DRY FLY AND ONE WET FLY TO FISH NORTH CAROLINA STREAMS, WHAT WOULD THEY BE?

A: My favorite dry fly would be a Parachute Adams tied with a pale yellow body. It is a great variation on this old pattern. With all the yellow insects we have such as sulfurs, little yellow stones cahills and even crane flies, it has been a producer for me. As far as a subsurface it to pick between a Pheasant Tail nymph Prince nymph, but I guess my favorite is a legged, bead head Prince nymph.

Q: WHAT IS YOUR FAVORITE PLACE TO FISH TROUT IN NORTH CAROLINA?

A: No question about it, the Nantahala Ri

Q: WHAT IS YOUR FAVORITE SPECIES OF FIS PURSUE WITH THE FLY-ROD?

A: Trout.

Q: IF YOU COULD SHARE ONE PIECE OF ADVIC OUR READERS THAT YOU THINK WOULD IM THE AVERAGE FLY-FISHERMAN'S ON-STREA CESS, WHAT WOULD IT BE?

A: When the fishing is tough to use smalle and lighter tippet. A lot of anglers get in tying on the same old size 12 or 14 nymph 3 or 4x tippet no matter what the condi Under clear low water and/or heavily pres fish you need to downsize both your flies tippet size.

In a day and age where everyone is looking for a newer and better fly, ROGER has reminded us that those old patterns were standards for a reason: They caught fish and they still do!

Ollie Smith

Oliver "Ollie" Smith may not have bee first fly-fishing guide in northwestern Carolina, but he is definitely the most c and one of the best. I learned a long tim that to be a good guide you not only ha get your clients to catch fish, but you m a comedian, storyteller and philosophe is all of these. Ollie was born in Charlo 1963 and started fishing soon thereafte in 1982 a life-changing event occurred. he started college at Appalachian Stat fly-fishing bug bit him hard.

He is a self-taught fly-fisherman, g through the school of hard knocks and and-error. He cut his teeth on the small t tain streams around Boone and the tail of east Tennessee. After college, he guid Wyoming for a couple of seasons and did commercial saltwater fishing from Alas the North Carolina coast. His heart was high country of North Carolina, thoug in 1995 he became a part owner of Fo Fishing Company, the Orvis store in the munity of Foscoe, between Boone and B Elk. Then in 2001 he realized, althoug

OLLIE'S enthusiasm, obsession for the sport, spinning of tall tales and his bigger-than-life personality have made him both a great guide and a legendary figure in North Carolina fly-fishing.

e lead guide for Foscoe, that his heart guiding and not retail. He sold his por- the business and still guides independ- o this day.

e's biography on his website says "Ollie Guide/Fanatic. Ollie has spent the last ars catching fish. When not fishing, kes to talk about fishing, when not about fishing, Ollie enjoys thinking ishing." His obsession with the sport ly outdone by his enthusiasm for it. As guide and common friend of ours and ice, "Every time you go fishing with t's like the first time he's ever been. ime he sees a fish rise to a dry fly he as excited as he was the first time he w a trout rise."

e is also a pleasure to work with or . When guiding on a river he always ts himself in a professional manner. n't fish with Ollie without his passion fishing spilling over to you. Ollie's asm, obsession for the sport, spinning ales and his bigger-than-life personal- e made him both a great guide and a ry figure in North Carolina fly-fishing.

U COULD HAVE ONLY ONE DRY FLY AND T FLY TO FISH NORTH CAROLINA STREAMS, OULD THEY BE?

vorite dry fly, although pretty much just er to early fall fly, is a beetle pattern. My subsurface fly is a Zebra midge, I fish it in different colors, but it is a solid producer ly in the winter.

T IS YOUR FAVORITE PLACE TO FISH FOR N NORTH CAROLINA?

water I've never fished before. I love to new places that I've never been before. ll of not knowing what I might catch next is around the next bend is what I love!

T IS YOUR FAVORITE SPECIES OF FISH TO WITH THE FLY-ROD?

ie, even though I've never gotten one on the fly rod. But I'm going to get one this winter ... maybe.

Q: IF YOU COULD SHARE ONE PIECE OF ADVICE WITH OUR READERS THAT YOU THINK WOULD IMPROVE THE AVERAGE FLY-FISHERMAN'S ON-STREAM SUCCESS, WHAT WOULD IT BE?

A: Just like the old saying in golf "you drive for show and you putt for dough," most fly fishermen try to cast farther than they need to or have the ability to effectively fish. Short, accurate and soft-landing casts will catch more fish than long casts. Very few people can cast accurately and soft enough at long distances to fish them effectively. It is harder to properly mend and set the hook on long casts also. The short game is the good game. ◆

Marty Shaffner is a writer and fishing guide living in Elkin. He is a frequent contributor to Wildlife in North Carolina.

FISH WITH LEGENDS

Bo Cash
www.tablerockangler.com

Kevin Howell
www.davidsonflyfishing.com

Ollie Smith
www.blueridgeanglers.com

Ollie Smith teaches Tara Lynch the technique in fishing a bead head Prince nymph in the Watauga River.

For most creatures, the world is a difficult place. Plants and animals must adapt or perish

When the Going Gets Tough

written by Jeff Beane / illustrations and nature activity by Anne M. Runyon

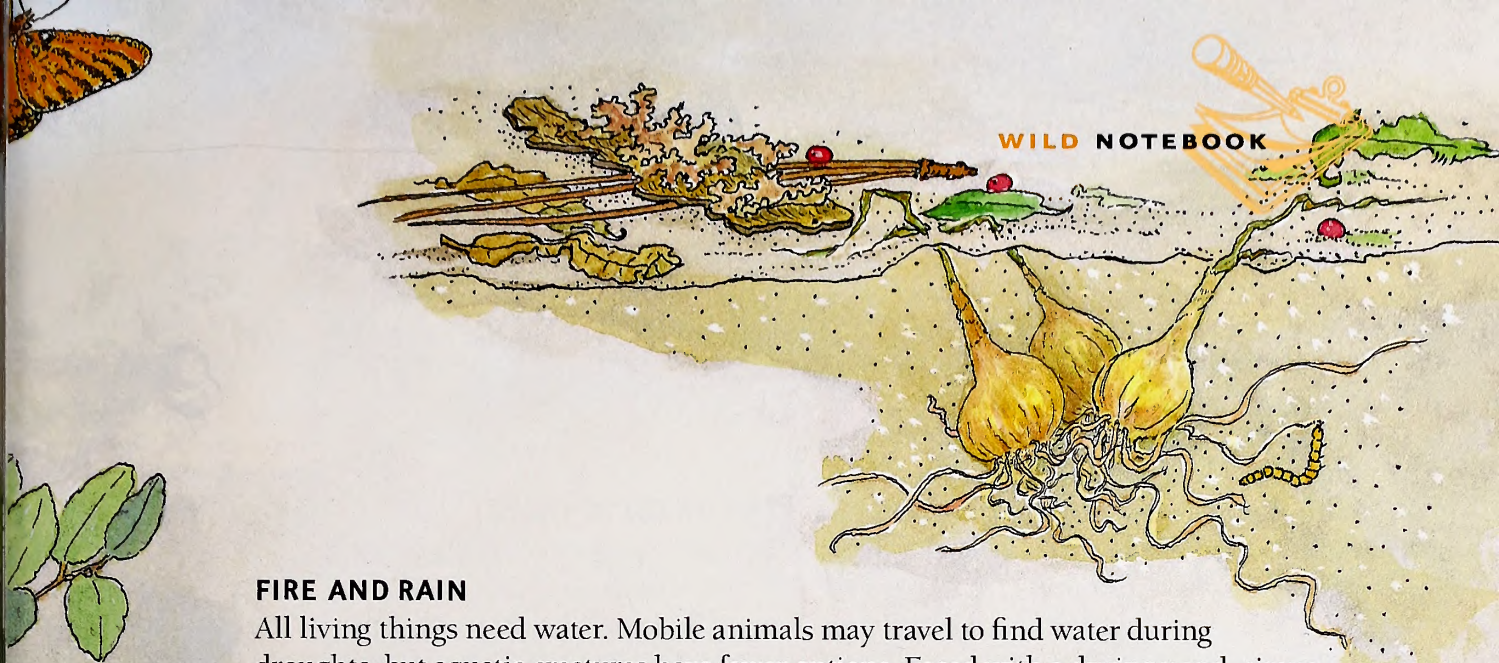
What would your life be like without a roof, electricity, clothing, plumbing, gadgets or grocery stores? Just ask most living things. In the real world, survival's the game. And there are almost as many different survival strategies as there are species.

HOT AND COLD RUNNING STRATEGIES

When seasons change, animals and plants must change with them. Mobile creatures, like some birds, bats and insects, ca migrate to warmer or cooler places. Those that can't must adapt Many animals (most reptiles, many insects, some mammals hibernate in winter. They find a protected spot—often under ground below the frost line, lower their metabolism and sleep until spring. Animals remaining active in winter have specia adaptations. Many mammals grow warmer, thicker fur. Grous and owls have feathers covering their feet. Chickadees and kinglets must eat constantly to fuel their tiny furnaces. Woo frogs and spring peepers have antifreeze in their blood.

Some trees drop their leaves in winter and go into sleeper mode. Those that don't (evergreens) have tough, leathery leaves (hollies, bays) or slender needles (pines, firs). Reduced surface area and a waxy covering protect evergreen leaves from freezing and water loss. These same adaptations protect some desert plants from heat extremes.

In hot weather, some animals, including spotted turtles, some butterflies and many amphibians, find a cool burrow or othe refuge where they become inactive, or aestivate. Others sweat, pant or cool off in water or shade.



FIRE AND RAIN

All living things need water. Mobile animals may travel to find water during droughts, but aquatic creatures have fewer options. Faced with a drying pond, sirens (eel-like aquatic salamanders) burrow into the mud and envelop themselves in slime to prevent desiccation. Some amphibian larvae can accelerate their metamorphosis, transforming early at smaller-than-normal size. Mud and chicken turtles leave the pond and bury themselves in sandy uplands for months or even years. Even some fish can survive for days in wet leaves or mud.

Too much water is equally problematical. Floods are hard on many animals, but some can swim to high ground. Fire ants survive floods by forming a tight ball that floats until the colony reaches land.

Fire is deadlier than water to some creatures, but vital to others. Longleaf pine forests and some other forest and grassland ecosystems are not only fire-tolerant, but fire-dependent. Animals can flee from fire, or retreat underground. Many plants have fire-resistant bark or foliage, or quick regeneration capacity.

PLANNING AHEAD

Nature's bounty is inconsistent. There are times of plenty and times of want. Faced with famine, some animals can migrate to greener pastures or change their diet. Some can endure months or even years without eating. Animals can accumulate body fat to help them through lean times, while plants store nutrients in roots or tubers.

Some animals plan for lean times. Mice, jays, titmice and some woodpeckers cache seeds for future consumption. Carnivores often bury a kill for later. Spiders hang fresh insects in their webs for leisurely dining. Honey bees devote much of their lives to food storage; their marvelous pantries are surpassed only by our own.

Strategies may vary even among closely related animals. Gray squirrels, chipmunks and woodchucks are all squirrels with different winter strategies. Chipmunks stockpile seeds in their burrows, alternately sleeping and feasting. Gray squirrels are "scatter hoarders," foraging all winter for nuts they buried at strategic locations in fall. A woodchuck stuffs his face all summer and sleeps winter away, sustained by his body fat.

HARD TO KILL

For many creatures, predators offer the toughest challenge—how to survive each day without being eaten. Some (rabbits, deer) outrun their predators. Others (moles, earthworms) hide from them. Still others, (whales, bison) grow intimidatingly large or strong. Animals may fight for their lives with teeth, claws, horns, antlers, hooves, beaks, jaws, pincers, venomous fangs, stingers or defensive chemicals. Others make themselves hard to eat with spines, thorns, thick bark or skin, shells or armored plates. Some are bad-tasting, poisonous or otherwise revolting. Hognose snakes and opossums use deceptive behavior to look dangerous or dead. Scarlet kingsnakes and spicebush swallowtail caterpillars mimic more dangerous creatures. Katydids, fence lizards and whip-poor-wills use their superb camouflage.

THE HARDEST TIMES

Even very adaptable creatures have limits. Sometimes the survivors aren't who you'd expect. A hot fire may consume a mighty oak, but tiny *Hypoxis* (yellow star-grass) pokes its fragile yellow bloom up through the ashes by the still-smoking stump. A drought may kill a big, tough snapping turtle while a petite mud turtle survives. Coping with tough times is all about adaptations, and different adaptations are what allow so many creatures to share one world.

But the hardest times ever may be on the way. Generalists, like coyotes and crabgrass, can survive a wide range of habitats and hardships. Specialists, like polar bears and cacti, can only live in specific situations, often where most other species can't. Specialists have an advantage over generalists under certain harsh-but-stable conditions. But when conditions change rapidly, generalists have the upper hand. As humans continually alter Earth's habitats and climate, more and more species find survival impossible. If our world becomes so impoverished that only a few species can survive, will we be among them?

Get Outside

Take a walk on a very hot or cold day (be sure to dress and provision yourself appropriately). What creatures can you see active? What adaptations do they have for withstanding sun, wind, snow, ice and temperature extremes? What creatures do you never encounter during summer? During winter? What do you think they're doing when you don't see them?

As you visit different habitats and environments—deserts, oceans, rivers, mountains—notice the plants and animals. Which ones are different from those in your yard? How do they differ? How are they able to make their homes in sand, rock, saltwater, strong currents, pounding surf or other harsh conditions? What survival adaptations can you see just by looking at them or watching their behavior? Always be careful in harsh environments and extreme weather—many creatures can survive conditions that you can't!

Read and Find Out

- "Food Hoarding in Animals" by Stephen B. Vander Wall, University of Chicago Press, 1990.

In *Wildlife in North Carolina:*

- "Stocking the Pantry" by Jeff Beane, March 1998.
- "Is it Better to Be a Generalist or a Specialist?" by Jeff Beane, April 2007.

Find out more about Project WILD Workshops and literature at the Wildlife Commission's Website at www.ncwildlife.org.

Make a Paper Sculpture of the ıdangered Red-cockaded Woodpecker

-cockaded woodpeckers have adapted to live well with the uent fires that define longleaf pine forests, but cannot com- with other cavity-nesting birds in mixed pine and hardwood sts. Restoring longleaf forests, and the fire needed to main- them, is crucial to the survival of a specialist like the red- :aded woodpecker.

ɔpy on cardstock (160%= approximately actual size).

ıt out body and wing boxes.

ecisely fold body in half. Cut out along black line, and cut shoulder slot.

ıfold. Glue head at beak.

ecisely fold wing box in half. Cut out along black line. Cut away yellow area last, keep wings aligned.

ue together wing top and undersides.

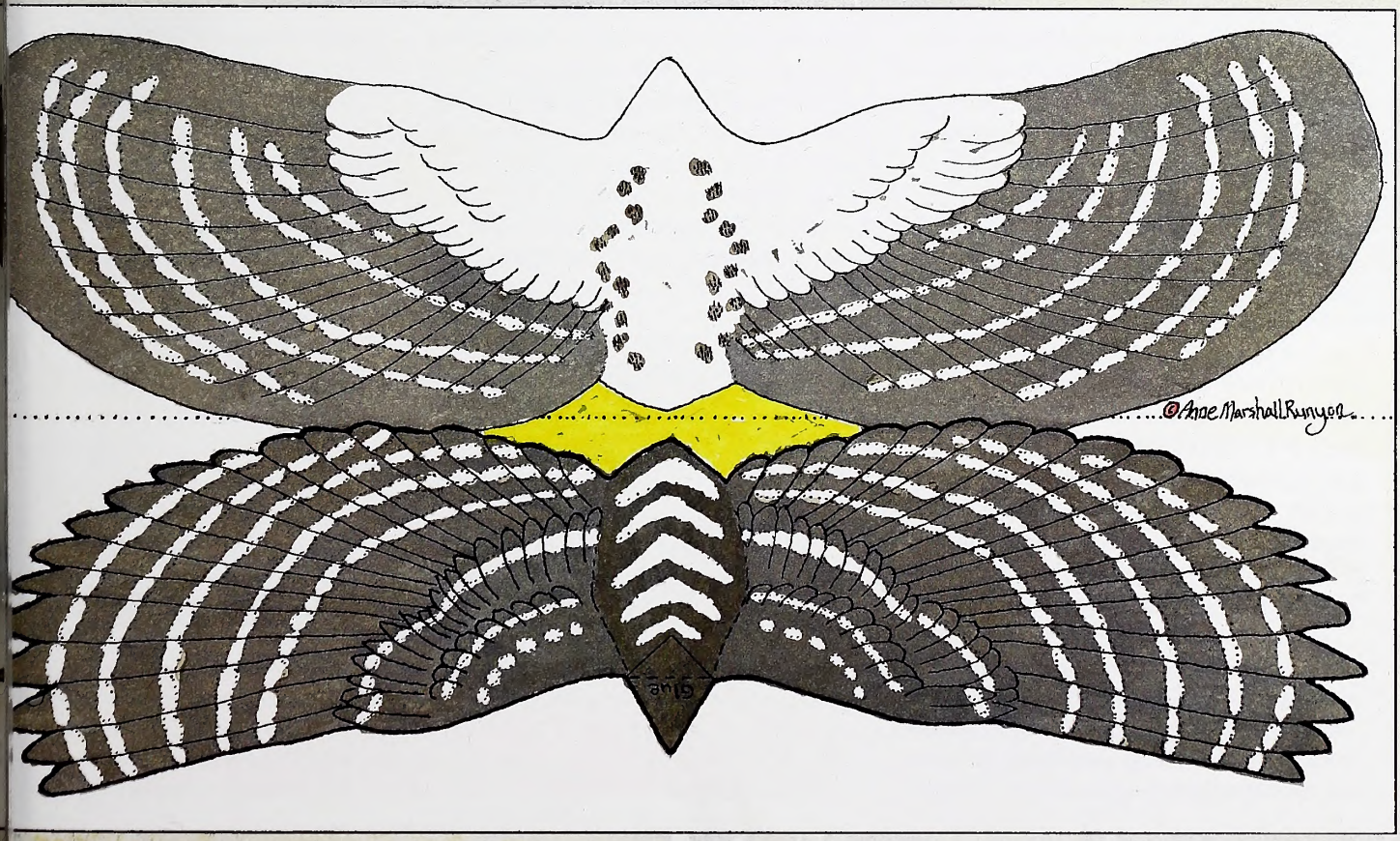
t glue on diamond and slip wings into slot.

ıch down along ···· lines on shoulders, and up at ---- line to sculpt shoulders.

ulpt wings by pinching up along ---- lines at body, curling down at wrists, and up wing tips.

ıch down along ···· lines on rump, fold up along ---- line, and down along ···· lines sculpt tail.

rl, overlap, and glue chest shut.



Forbush Red, Stanly County Earn Hunter Skills Honors

Forbush High School's Red Team, of Yadkin County, won the Senior Division of the 2011 Youth Hunter Skills Tournament in April, while Stanly County's Park Ridge Sharpshooters took the junior division title.

Lee Efird of Gray Stone won the overall senior individual title with 764 points, while Austin Bryant of the Northeast Eagles was second with 761 and Andrew Byrd of Forbush Red third with 760.

Shannon Efird of Park Ridge took the junior title with 757 points, ahead of second-place teammate David Singletary with 742 points and third-place Cole Allen of South Davie Orange with 737 points.

The tournament, conducted by the Hunter Education Program of the N.C. Wildlife Resources Commission, was held under ideal conditions at Millstone 4-H Center near Ellerbe.

Nearly 600 students from 52 schools participated in this year's tournament, which determined state champions in team and individual categories. Teams and individuals qualified for this event during nine district-level tournaments held across the state in March, with thousands taking part.

The competition is an incentive component of the state Hunter Education Program, provided as an opportunity to showcase outdoor skills and demonstrate safety, with events in rifle, shotgun and archery marksmanship, as well as an orienteering challenge and a wildlife knowledge test. Teams are organized within public and private schools, while home-schooled students and teams representing organizations such as 4-H or FFA also can compete, provided they meet eligibility requirements.

The inaugural Fred Rorrer Trophy, recognizing sportsmanship among competitors, was presented to Gray Stone Day School of Stanly County. The annual award is named in memory of the longtime hunter educator and sportsman who passed away in October.

MELISSA McGAW/NCWRC

GEOFF CANTRELL

"That is the most important trophy given today," a parent told team members as they posed for photos. Criteria for receiving the trophy included exhibiting sportsmanship both on and off the field, acting in a manner befitting the traditions of shooting sports and hunting, and engaging in ethical behavior and fair play at all times.

"All the competitors in the 33rd annual tournament should feel a sense of achievement," said Travis Casper, the state assistant hunting education coordinator. "I know that we, the parents, coaches and organizers tainly are proud of their accomplishmer These youth are a good reflection of th hunting and outdoors community. I thin future of conservation will be in good ha

Hunter education is required for all f time hunting license buyers in North Carolina. For more information on free h education courses, the Home From The Hunt™ safety campaign or youth progr offered by the commission, call 919-707 0031 or visit www.ncwildlife.org.

SENIOR TEAMS OVERALL

School	Score
Forbush Red	3743
Gray Stone	3732
North Davidson	3719
Perquimans	3694
Southern Alamance	3660

JUNIOR TEAMS OVERALL

School	Score
Park Ridge	3564
South Davie Orange	3529
South Stanly	3491
North Davie Orange	3488
Chowan Middle	3443

e NEWSLETTER
Get N.C. Wildlife Update—news including season dates, bag limits, legislative updates and more—delivered to your Inbox from the N.C. Wildlife Resources Commission. Sign up at www.ncwildlife.org/enews.

Caulk Named Conservation Officer of the Year

ry Caulk Jr., a second generation wild-
fe officer with the N.C. Wildlife
ces Commission, has been named the
rvation Officer of the Year by the Safari
nternational Foundation.
ou have been a true champion for con-
on through policing wildlife protection
at are in the best interest of wildlife and
e management. We appreciate your
," said Joseph H. Hosmer, president of
ari Club International Foundation in a
nnouncing the selection. "This pres-
award recognizes individuals who
ade significant work achievements
alf of sportsmen and sportswomen.
ted officers are recognized each year
ir contributions to the protection of
t and species alike throughout the
ongratulations!"
ri Club International Foundation pro-
science-based conservation through
research, capacity building in govern-
youth and teacher education, and
itarian programs that show the impor-
f the hunting community in society.
2000, the Safari Club International
ation has provided $47 million to con-
n, wildlife education, and humanitar-
grams around the world.
e 200 wildlife officers work to enforce
ucate North Carolina fish and game
which apply to all lands, public or pri-
roughout the state.
is award recognizes someone who goes
nd beyond the call of duty to ensure
aws are followed and those who com-
enses are brought to justice, and
Officer Gary Caulk certainly meets
eria," said Colonel Dale Caveny, chief

MELISSA McGAW/NCWRC

of the Division of Law Enforcement of the Wildlife Commission. "He is an outstanding reflection of the profession and this agency."

Caulk, stationed in Moore County, followed in his father's footsteps to become a wildlife officer. Growing up, he watched Gary Caulk Sr. during the course of his career and decided early on to do the same. Gary Caulk Sr. started as a wildlife officer in 1975 and retired after 30 years with the N.C. Wildlife Resources Commission.

"Growing up, I saw how happy he was, doing what he did and that made an impression on me," Caulk said. "He was the one who got me into hunting and fishing. And I saw the problems with poachers, which really rubbed me the wrong way, and made me want to help out, the same way he did."

Gary Caulk Jr. became a wildlife officer in 2000 and got to serve five years in the same ranks, although different location, as his father.

"Looking at the work of Safari Club International and Safari Club International Foundation, I'm excited about their many programs, and I'm appreciative of them helping all of us to give back through education and enforcement," Caulk said. "Receiving this award, I thank them but I owe a lot to a lot of different people. My dad for getting me started, my training and support of fellow officers, so I will have to accept it on their behalf."

Sportsmen and the public can assist wildlife officers in their duties by reporting fish and game violations at 1-800-662-7137. For more information on hunting and fishing regulations, hunting education programs and safety, visit www.ncwildlife.org.

Safari Club International Foundation is a 501(c)(3) charitable organization that funds and manages worldwide programs dedicated to wildlife conservation, outdoor education, and humanitarian services.

New Law Eliminates Pistol Permit for Crossbows

N.C. Wildlife Resources Commission is advising hunters
at a bill removing the requirement to obtain a pistol permit
r to purchase or transfer ownership of a crossbow has been
into law.
iously, state law required anyone buying or otherwise receiving
ow in North Carolina to have either a pistol permit from their
eriff's office or a concealed handgun permit.
ssbows are a legal method of hunting in North Carolina, per-
e anytime bow-and-arrow hunting is allowed. However, the
e Commission does not regulate the sale or purchase of fire-
nd crossbows.
commission's Home From The Hunt™ safety campaign
nends these crossbow guidelines:

Never carry a crossbow cocked and loaded with a bolt (arrow).

Keep fingers and thumb below the rail at all times.

When cocking, be sure that your foot is firmly planted in the cocking stirrup.

Never dry-fire a crossbow, which can cause sudden breakage.

In North Carolina, all first-time hunting license buyers must successfully complete a Hunter Education Course, offered free across the state. Visit www.ncwildlife.org/Hunting/H_Hunter_Ed_-Course.htm for schedule and availability or call (919) 707-0031 for more information.

CALENDAR OF EVENTS

Friday, July 1

Join experienced instructors for a day of fun as you learn the basics of fly-fishing in the Women's Introduction to Fly-Fishing class at Pisgah Wildlife Education Center near Brevard. Bring a lunch and non-slip shoes or waders. Limited to 6 participants. Call (828) 877-4423.
Visit www.ncwildlife.org.

Saturday, July 9

Check out the 48th Annual Coon Dog Day in Saluda. Festival includes live music, contests and judging for dogs.
Visit www.saluda.com.

Saturday–Sunday, Aug. 6–7

See the latest in guns, knives and other outdoor gear at the Dixie Gun & Knife Classic at the Jim Graham Building on the N.C. State Fairgrounds in Raleigh.
Visit www.dixiegunandknifeshow.com.

Friday–Sunday, Aug. 19–21

Check out the latest in boats at the Carolina Fall Boat Show & Sale at the N.C. State Fairgrounds in Raleigh.
Visit www.ncboatshows.com.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

IN SEASON

This month, these seasons are open in North Carolina:

Hatchery Supported Trout Waters: Through Feb. 28, 2012.

Crow: Wednesday, Friday and Saturday of each week through July 31, 2011, plus July 4.

There is no closed season or bag limit for groundhog, coyote, striped skunk, nutria and armadillo. There is an open season for taking beavers with firearms or bow and arrow during any other open season for the taking of wild animals.

Check the *2010–2011 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org. A new *Regulations Digest* will be available by Aug. 1.

Commission Offers Summer Camps in Ralei

The Centennial Campus Center for Wildlife Education in Raleigh is offering a pair of weeklong camps in July. Becoming an Outdoors Diva is a free program for young women, ages 12 to 17, on July 11–15 at the Centennial Campus Center for Wildlife Education in Raleigh. The daily camp time is 9 a.m. until 4 p.m.

Camp Out-Door-Rageous is an outdoor, outrageous and free summer program for boys and girls, ages 13 to 17. The program is scheduled for July 25–29. The daily camp time is 9 a.m. until 4 p.m. Pre-registration is required.

Learning to be an outdoors diva means activities like catching and cooking your own fish, shooting a bow and arrow and building a fire the old-fashioned way — no matches allowed. This is the first year for the program, modeled on Becoming an Outdoors-Woman, an international program of hands-on learning and outdoors experiences sponsored in North Carolina by the N.C. Wildlife Resources Commission.

"The program is intended to build self-reliance and confidence, as well as introduce young women to a wide variety of outdoor activities," said Kelsey Obernuefemann, an educator at the center. "At the end of the week, the campers will compete in an 'Amazing Race' competition using their new outdoors skills."

Additional activities scheduled include:

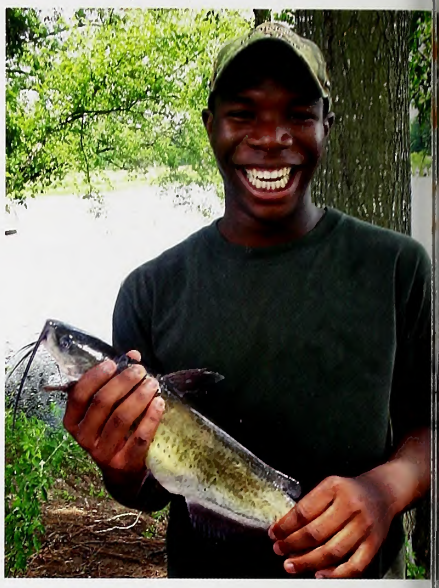
AN OUTDOORS DIVA STYLE SHOW

BUILDING A SHELTER IN THE WOODS

LEARNING TO USE A MAP AND COMPASS

IDENTIFYING ANIMAL TRACKS AND SIGNS

TRAPPING AND RELEASING SMALL MAMMALS



KNOT TYING

NATURE JOURNALS

To learn more about Becoming an Outd Diva or to register, contact Obernuefem at kelsey.obernuefemann@ncwildlife.or (919) 707-0202.

"Camp Out-Door-Rageous is a han on experience that builds self-reliance and teaches new outdoors skills," said Obernuefemann. "While conducted in a urban setting on the Centennial Campu N.C. State University, the camp offers pl of opportunities for learning about conse tion through outdoor skills at nearby L Raleigh and surrounding woodlands."

Campers will build a fire without mat trap and release some wild animals, catch cook a fish and learn how to shoot a b and arrow.

Additionally, campers will:

BUILD A SHELTER IN THE WOODS

USE A MAP AND COMPASS

IDENTIFY ANIMAL TRACKS AND SIGNS

TRAP AND RELEASE SMALL MAMMALS

PRACTICE KNOT TYING

CONSTRUCT A FISH TRAP

The Centennial Campus Center for V life Education is a free visitor and learni facility of the Wildlife Commission. Lo at 1751 Varsity Drive, the easily-accessil center features interactive exhibits highl ing Piedmont wildlife species and habit

To register or for more information, co Ann May at ann.may@ncwildlife.org (919) 707-0207.

NCWRC

Why Are Some Lakes Clear While Others Are Murky?

tten by Clyde Sorenson
strated by Jim Brown

ORTH CAROLINA IS BLESSED WITH MANY NATURAL and man-made
es, from the Mountains to the coast. Some are crystal clear, while others are murky
d greenish. The clarity of fresh water is dictated by two primary, and somewhat
ated, factors — sediment and nutrients.

PRICE LAKE, near Grandfather Mountain

Mountain impoundment

ar lakes such as some of the small reservoirs
he Mountains, and White Lake in Bladen
inty, are clear because they receive little or
sediment and dissolved nutrients. The water
s contains very little nitrogen and phos-
orus, the main nutrients needed by algae.
h clear, nutrient-poor water bodies are said
e oligotrophic, and usually can support
tively small fish populations.

Piedmont reservoir

The water in many of our Piedmont reservoirs has a greenish tinge, and visibility through the water is low. This is because these lakes receive abundant nutrients and sediments in the run-off they receive from their huge watersheds, and algae, and the organisms that eat them, thrive. Our activities, including agriculture, can enhance nutrient flow to these eutrophic water bodies. Eutrophic water bodies can support large numbers of fish, but when large populations of algae die, their decomposition can suck the oxygen out of the water, resulting in fish kills.

Coastal Plain black water

The blackwater swamps and lakes of the Coastal Plain typically are nutrient poor like oligotrophic waters. The black color and low nutrients are a result of the decomposition of leaves and other plant matter produced in the forest they drain. Black water is usually quite acidic due to the tannic acids that give it its color.

Fishing Alone

written by Jim Dean

Sharing is something that most of us do without even thinking about it. If we're fishing in a boat and open a pack of Nab peanut butter crackers or a can of Vienna sausages, we invariably offer a couple to our buddy. It's a nearly universal and automatic reflex born of good manners. Yet, I must confess that my normally generous spirit sometimes goes AWOL. Not only do I occasionally decline to share, I ensure that I won't have to. The issue isn't food or anything like that, however. It's more a matter of spending quality time with the person you know better than anyone else—yourself.

JIM DEAN

"I long ago discovered that the solo pursuit of a ruling passion has its own special rewards."

For as long as I can remember, I have sometimes chosen to go fishing right by myself, no invitations extended. Indeed, there's a good chance that I will neglect to tell a living soul where I'm going (maybe not a good idea at my age).

You and I both know people who would find this strange. We are social animals and we typically enjoy company, but some folks seem to be quite literally threatened by the notion of spending a few hours alone. They hate it, get antsy, dial their long-suffering friends to chat aimlessly, and if they fail to connect with another human, they cuddle the cat and make it equally miserable.

Yet being alone is not the same as being lonely. It's true that I sometimes fish by myself because I can't find anyone to join me, but I long ago discovered that the solo pursuit of a ruling passion has its own special rewards.

One balmy afternoon in early spring, I was engaged in some much needed yard work when it occurred to me that bluegills and bass might be moving into the shallows to look for spawning sites in a small pond I occasionally fish nearby. Like us, fish tend to think about such things well before any opportunity presents itself—a weakness that begs to be exploited.

I abandoned the lawn mower in the middle of the yard, threw some drinks in a cooler, changed into shorts and fired up the 1977 Bronco that serves as my ever-ready rolling tackle box. A few minutes later, I had launched and loaded the 12-foot johnboat.

When I fish alone, I do so at a far more leisurely pace than when I have company. My usual fishing buddies and I don't regard fishing as a competitive sport—bless them for that—and we are generous in sharing the good spots. But when I'm the only one in the boat, I know I'm going to get the first selfish shot at all the best spots, so what's the rush? Besides, I love to experiment, which means I may snip off a lure or fly that's been catching fish just to see if anything else might work.

The delicious benefit of fishing alone is that you can fish any way you like without inconveniencing anyone else. You can hang your bare feet over the side of the boat, sip a cold beer, stare at the clouds, take a nap, watch a red-winged blackbird, whatever you want to do. It's just you and your obsession, and if that isn't enough to make you happy, then Heaven help you (because I can't).

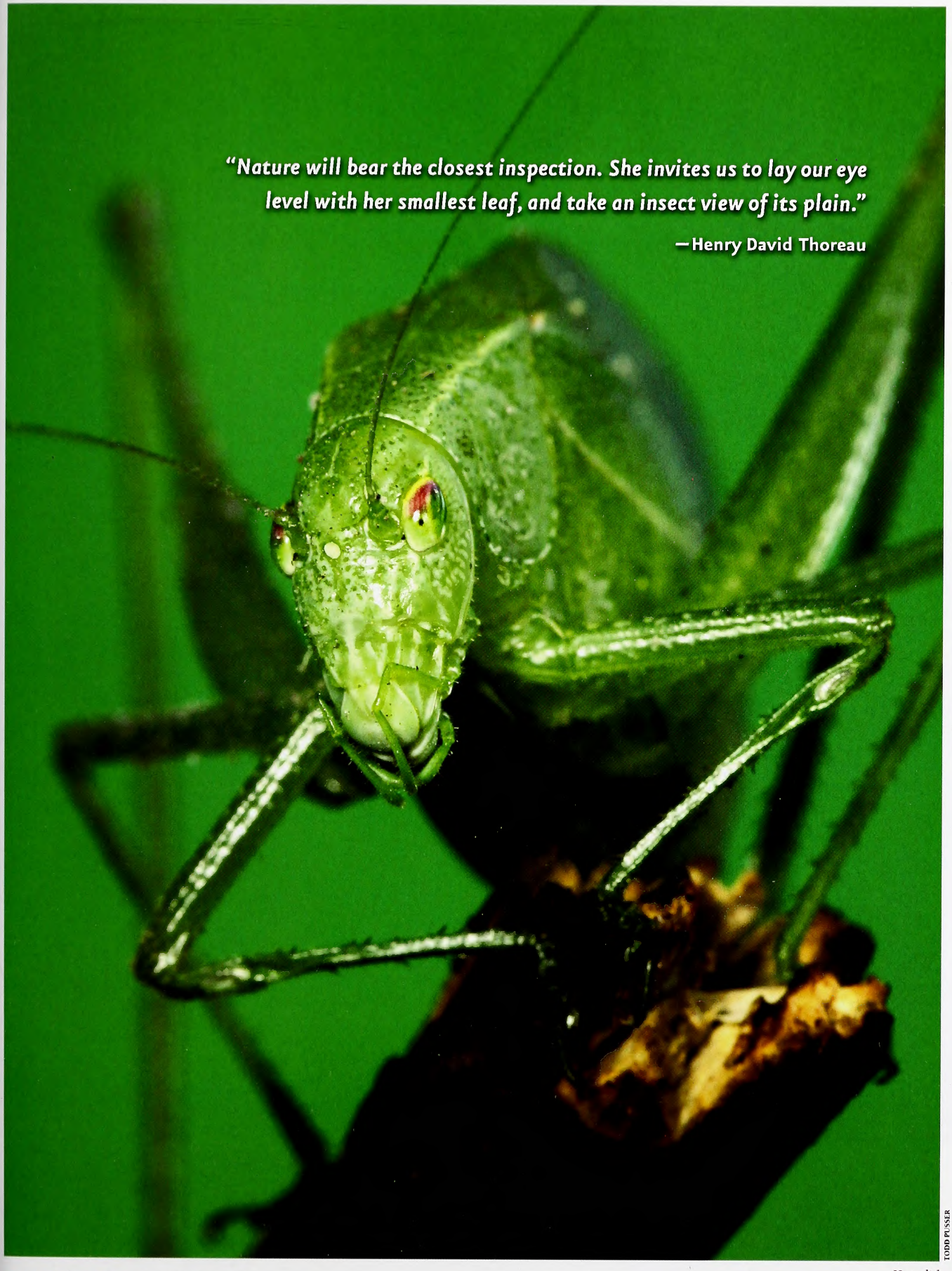
I'm sure my deliberate and piddling approach would drive some fishermen nuts, but for me, it's like eating a really good meal very slowly, savoring each bite, and saving the best for last.

To stretch out the afternoon, I decided to fish deeper water first and move to the shallower upper end and shorelines as the afternoon waned. I started off using a fly rod with a simple sinking bug tied on a No. 8 hook with a body of black chenille and six white rubber legs. I caught lots of smallish bluegills throughout the afternoon, along with several yearling bass.

Late in the day, I finally left the open water and began to fish for bass along the shaded shorelines. I decided to try a fast-moving, noisy-propped buzzbait first. It's a lure bass often ignore except in early spring, but they'll sometimes grab it then, months before they'll eat most other topwater lures.

I saw the wake coming before the fish intercepted the lure in a washtub-sized shower of spray. It made such a powerful run that the monofilament burned a groove across one finger. After several desperate minutes, I slid the net under a fat female largemouth that was as long as the 24-inch net handle. I wished later that I had taken the time to weigh it, but I wanted to release it safely.

As I watched it swim away, I realized that it was the biggest bass I'd caught in years. It was only after my heart rate was normal again that it also occurred to me that there might be disadvantages to fishing alone. I had no witnesses, and thus, no hero photos. A couple of congratulatory Nabs would have tasted pretty good, too.



TODD PLUSSER

Katydid

IN THE SEPTEMBER • OCTOBER ISSUE

RALPH HENSLEY

BUILDING BIG BUCKS

A bit of cooperation on some common-sense hunting guidelines will help cultivate bruiser whitetails where you hunt.

BORN AN ANGLER

A longtime outdoorsman reflects on how his fascination with moving water led to his becoming an angler at age 5.

DON'T BLOW IT

Can North Carolina develop sustainable wind energy without harming birds and other wildlife?

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WILDLIFE IN NORTH CAROLINA

NORTH CAROLINA Wildlife RESOURCES COMMISSION

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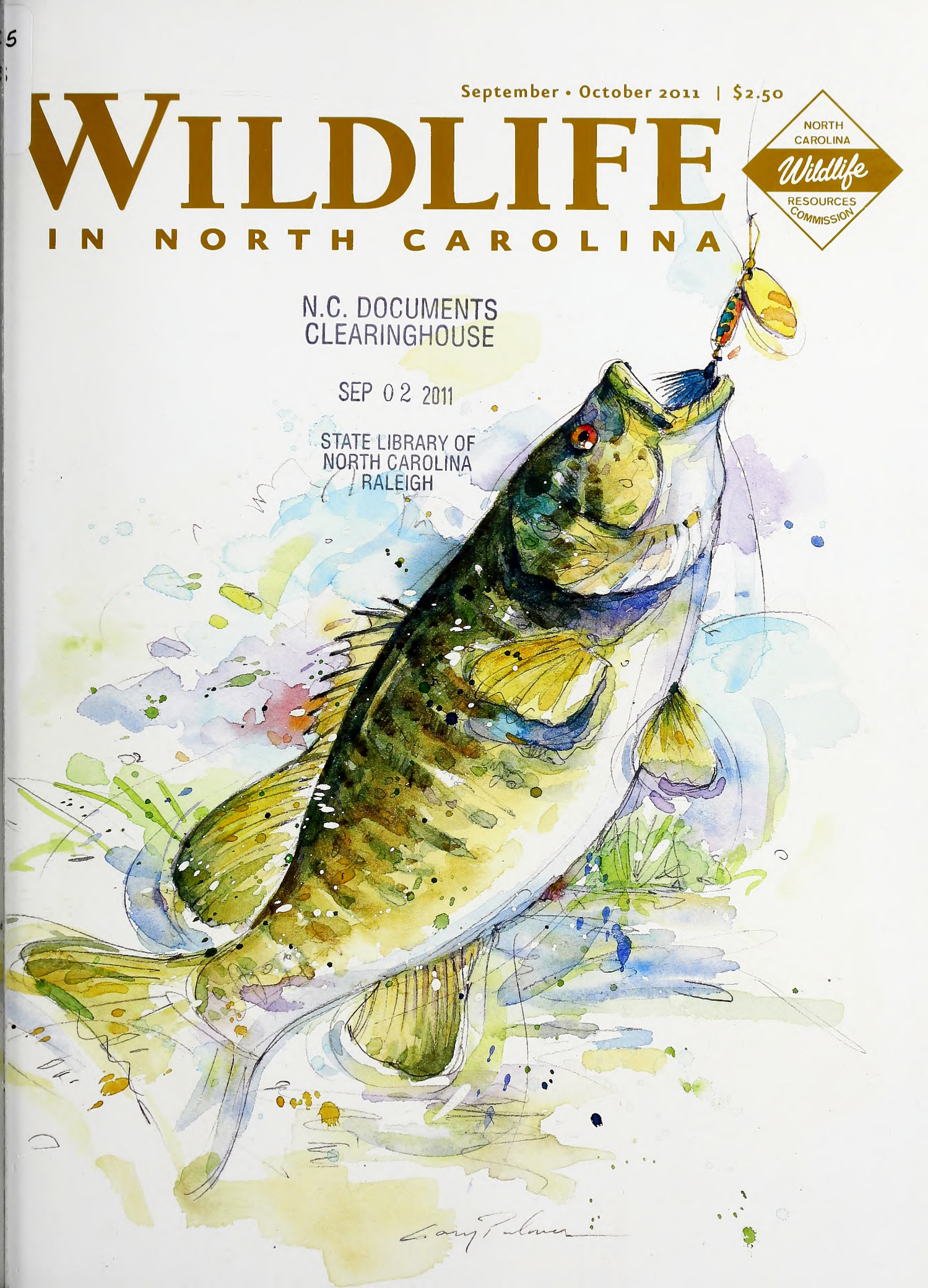

This large-antlered deer creates an olfactory cue for other whitetails by mouthing a pine limb and leaving behind the scent of his saliva.

PHOTOGRAPH BY MELISSA McGAW/NCWRC.

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WILDLIFE IN NORTH CAROLINA

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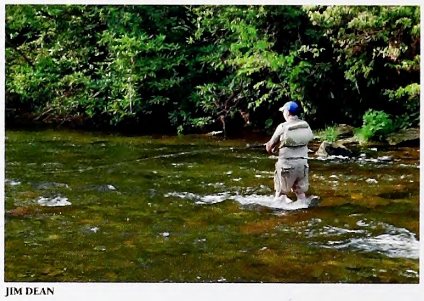
Cover: The smallmouth bass is one of our state's premier game fish and has lured many an angler into a life of fishing. ILLUSTRATION BY GARY PALMER.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

September and October are curious traveling companions, as different from beginning to end as any two months of the year. September in North Carolina harbors the dried-out husks of summer. Opening day of dove season likely will be hot and sweaty and the birds will demand attention once they are down. A cold drink late in the afternoon will seem like a gift from beneficent hunting gods, or a companion who was better prepared than you.



JIM DEAN

October days spent on Delayed Harvest trout streams or sitting in a tree stand will be a mix of hot and comfortable, but the month will end with the promise of winter. Most areas of our state will have experienced a frost by that time, and cold weather, interspersed with Indian summer days, will follow in short order. On a not-too-distant day, we will awake to find winter on the land and perhaps think fondly of those 90-degree days.

Although a number of hunting seasons begin in September and October, most are preludes, warm-ups, to the seasons of November and December. Hunting in hot weather is difficult and doesn't appeal to everybody, but there are opportunities galore, such as Canada geese, whitetails, grouse and three species of squirrels. Being an old-school hunter—or perhaps just old—my favorite hunting is in the cold, when the ticks and chiggers are but distant memories and the red, frozen clay of the Piedmont crunches underfoot. I figure I can stay warm easier than I can cool off.

So after dove hunting a few times, I'll spend a good part of these two months fishing. It doesn't matter particularly whether I head east to Lake Mattamuskeet or the Alligator River or west to Avery or Caldwell counties. I'm happy with either, although as the year dwindles, I'm more inclined to head toward the Coastal Plain, where warm days linger and on a good day a man can catch eight or 10 species of fish in fairly short order from the same piece of black water. He might also catch nothing, but where there is water there is promise. Sometimes promise is enough. Or as Aldo Leopold wrote, "What was big was not the trout, but the chance."

And a chance is what September and October offer us. The chance to hunt, fish or wander the woods and river banks. That should be big enough for any of us.

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IN NORTH CAROL
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ing Memories

lson's skillfully written and (as always) ly researched three-part series on fish ation in North Carolina, (April, May, 011) brought back long-forgotten mem- r me. Particularly, the third in the series over 61-year-old memories of early ry experiences.

as in the early 1950s when Fish Division larry Cornell and I drove practically out ne of the few runways of the Raleigh- n Airport (try that today!) and watched tern Airlines DC-3 taxi up to us with its fertilized walleye eggs from New York lestined for our Table Rock Hatchery— st introduction of walleyes for North a reservoirs. Walleyes had been docu- d in the Roanoke River in the 1900s, but g since disappeared from that river. shed the eggs to Table Rock where Scruggs and I baby-sat the hatching round the clock for several days. Our tcheries were rather crude and antique y today's standards. Maybe it's a good ve didn't realize it.

Duane Raver
Garner

sitting on my front porch reading the sue of *WINC*, I was struck by how much the articles were related, Bruce Ingram's Ribbon Stream") and Jim Wilson's ("Fish Millions"). When I first came to work 2, the Nolichucky River from the surface to the bottom was the great white way [because of mining pollution] from Spruce Pine into Tennessee. Interestingly, the restoration of the sports fishery was both due to improved water quality and the reintroduction of expropriated species. The river's remarkable recovery was due to more than just the Clean Water Act.

Thanks to local pressure by conservationists and sportsmen, such as A.D. Harrell of Red Hill, the NCDNR Division of Water Quality and EPA began to prohibit the dumping of mining waste into the river. Beginning in 1979, sportsmen, notably Tommy Anderson and Larry Carpenter of Morganton, helped the NCWRC by providing smallmouth bass brood stock from Lake James to Table Rock Hatchery. Stocking of smallmouth bass in the Nolichucky River began in 1980 and continued for three years. Musky were reintroduced beginning in 1979 thanks to the pioneering efforts of W.R. Bonner and the staff of the Table Rock Hatchery.

Bob Brown
NCWRC fishery biologist (ret.)
Morganton

I greatly enjoyed Jim Wilson's series on fish culture in North Carolina. A lot of the early stocking and hatchery work occurred on my home waters. My grandmother lived in Old Fort, so my buddy Roger Brown and me rode our bikes to Mill Creek and on occasional big trips to Curtis Creek. We imagined every deep pool held trout like we had never seen.

Now I know at one time some very interesting fish did indeed swim those waters. Thank you Mr. Wilson for a very interesting and informative series on fish management, past and present. I won't hold it against you that you omitted my favorite exotic fish (and latest obsession), kokanee salmon.

Mark Swann
Black Mountain

More Bang for the Buck

I was certainly disappointed to see that I won't be receiving my *Wildlife in North Carolina* each month. I have subscribed longer than I care to recall, as did my father before me. For the information along with the great photos, we were getting way too much bang for our buck. I can't think of any sports magazine that has rates as low as *Wildlife*, for instance Ducks Unlimited is $25.00 per year. I guess what I am saying is to charge us what this great magazine is worth and there should not be a problem. My 2 cents worth.

Bill Rose
Calypso

Last, First and Alone

I always read the last page first. Jim Dean's column in the May 2011 issue brought back memories of a southwestern Montana fly-fishing day years ago. I was fishing with my son, who at the time was guiding fly-fishermen in that area of Montana. We are both diligent catch-and-release anglers. Our October day had been very productive, catching big brown trout on streamers.

While loading our drift boat at day's end we were approached by two "Patagonian clad" dudes inquiring as to our methods and success. Jokingly I relied we had an icebox full and they were welcome to a "mess" if they needed dinner. The tongue lashing I received only ended when I showed them the empty icebox. That experience also improved my appetite for fish.

I have been a subscriber to *Wildlife in North Carolina* for longer than I can remember. I read my Dad's copies when I was a boy. My subscription has followed me to Colorado, Utah, and Georgia.

Tom Gardener
Edenton

Jim Dean's "Fishing Alone," in the July-August issue, hit the nail on the head. The solitude of being alone on the water and having a conversation with Mother Nature is priceless. You can fish at your own pace, never get out-fished, and no one will tell where you caught 'em.

Vern Parker
Washington

rite us

Letters should be sent via e-mail to **letters@ncwildlife.org** *or through regular mail to Letters, Wildlife in North Carolina magazine, 1712 Mail Service Center, Raleigh, NC 27699-1712. Please include your name, address and daytime phone number. Letters chosen for publication may be edited for clarity and length.*

The Modern SMOKEPOLE SEASON

You never forget your first deer. I guess that's one of the reasons muzzleloading season is so special to me. It was the last day of the season about 18 years ago, when I made plans to go hunting with Jeff Moore and his dad. Jeff had me climb up in a nice, straight poplar tree overlooking a patch of white oaks where deer had been appearing regularly. As the morning progressed, I didn't see a thing. As I sat looking at the fall foliage, I could hear shots in the distance, so somebody was seeing deer.

About 10:30, I heard something directly behind me. Instead of just sitting still and allowing the animals to come in, I stood up abruptly. Just then I heard a snort, and three does bounded a couple of leaps in different directions and stopped. I picked out the best shot on one of the does, took a deep breath and squeezed the trigger. The deer fell in its tracks. I had hunted for whitetails several rifle seasons prior to this moment without connecting. I was so elated; I think Jeff was as happy as I was.

I had received the muzzleloader a year before as a Christmas gift. It was a Thompson Center New Englander. I remember thinking at the time: *What am I going to do with this Daniel Boone gun?* But then it occurred to me: *This rifle will give me an extra week to hunt now.* Wheels continued to turn, and I've hunted every muzzleloading season since.

Today's muzzleloaders offer hunters advantages similar to centerfire rifles, and with the extended season, they make for a great opportunity to fill a tag.

ADVANTAGES OF MUZZLELOADING

In my area, muzzleloading season is two weeks long. Also, a hunter can harvest either sex, which gives ample opportunity to fill the freezer. The deer populations in North Carolina have grown in recent years, allowing for this. At one time, you were allowed to hunt for bucks for the first five days of a six-day season, and hunt either sex the last day.

The weather that time of year isn't too cold. You don't have to wear so many layers of clothing, which can restrict movement. A long-sleeved button-up shirt or light jacket along with a blaze orange vest will do. Some mornings in mid-October can have a light frost and then warm up nicely. But it never fails —it seems that it rains at least part of every muzzleloading season. It's well worth it to invest in a quality rain suit for this purpose, but I hate the thought of water getting near the primer. I usually keep it covered with my hand, but you can put up a special umbrella

WRITTEN BY JEREMY GRADY // PHOTOGRAPHED BY CHIP LAUGHTON

Whether a hunter uses a modern muzzleloader or a more "primitive" version of the rifle (as shown), he can enjoy extra days in the field during white-tailed deer season.

made just for deer hunters who use a climbing stand. It simply screws into the tree. The umbrella works well in light rain, but if the rain turns into a downpour, or some wind starts to blow, you can get wet.

There's no more beautiful time to be in the woods than mid-October. The turning leaves make for some pretty scenery. There have been times when I've hunted a stand location for several days and could tell a difference in the colors of the leaves. There are still a lot of leaves on the trees, so you can't see as far as you would like, but that's OK.

Muzzleloaders have come a long way in recent years. You can now buy a kit for around $300 that includes a rifle that's drilled and tapped for a scope and includes rings, bases and essentials such as bullets, powder charges, bullet starter and decapper. That's all you need to get started, and it is a lot of equipment for the price. I would suggest buying some quick loads. These are small plastic devices that hold a couple of powder charges and bullets so you can quickly reload. If you want to get really serious about it, you can spend upwards of $600 for some very nice models.

A lot of today's muzzleloaders break down like a single-shot shotgun. This allows for easy cleaning and easy placement of a primer. There are some models with a bolt that you cock back. You can place the safety on after it's cocked or pull back the bolt when you see a game animal coming. Almost all of today's muzzleloaders have what is called an inline ignition system. Basically, when the primer is discharged, it shoots fire straight into the powder charge. This is far superior to the old system, in which the fire had to make a 90-degree turn to ignite the powder. The older system used No. 11 caps, and misfires were common. With the newer system, the ignition has been upgraded to a 209 shotgun shell primer, which is incomparably hotter. The inline system provides surefire, positive ignition every time. I have yet to misfire on an animal or at target practice.

The next improvement was the premeasured powder charge. We used to have to pour black powder or Pyrodex out of a flask into a nipple, or some sort of powder measurer, several times to get an exact amount for each shot. Sometimes you did not get the same amount, causing the bullet to be less accurate. Nowadays, there are preformed powder charges in 50-grain increments. The amount of powder your rifle was designed for and the distance you're shooting determine how many charges you use. Just drop two or three preformed powder charges down the barrel, and you have the correct amount of propellant every time.

As for bullets, hunters use mostly a jacketed or solid bullet that's paired with a plastic sabot. A sabot is like a little plastic cup that the bullet sits in, which slides snugly down the barrel, with no lubricant necessary. These come paired together when you buy them. Some of the bullets are the same pistol bullets that are used for reloading. These bullets are more accurate, open up better upon impact and have better knockdown po than round balls.

The last big improvement to muzzlelo was putting scopes on them. Fortunate North Carolina hunters, scopes on mu loaders are legal. There are some state which scopes are illegal. Before the ri were drilled and tapped at the factory, s hunters tried to do it on their own, wh was a little spooky to me. Now when y buy one, it's already drilled and tapped scope. Scopes help with shot placemen better identity of the animal. Also, if yo have poor vision, a scope is vital. Moun a scope on a muzzleloader is no differe than mounting one on a rifle.

Once sighted in, muzzleloaders can accurate as some centerfire rifles. At 50 y mine shoots a three-shot group that ca covered with a 50-cent piece—plenty range and accuracy for me. Some hun want to stay more traditional and use o sights, which I can understand. It's sim to using recurve bows instead of compo bows with sights. If the scope gives the hu more confidence in making a good sho harvest an animal, then so be it. It defi gives me more confidence.

After all these improvements to muz loaders, you end up with the characteri of a centerfire rifle. Muzzleloaders don't as much recoil as some centerfire rifles like a .410-gauge shotgun. In essence w the new muzzleloaders, it's almost like hu two weeks extra of rifle season.

GOOD HOUSEKEEPING

The main drawback to using a muzzlelo is cleaning one. This is one thing that y

) if you want to hunt with it for any longevity. To me, cleaning a muzzle- s like any other maintenance I would ny of my hunting or fishing equip- 't's part of the actual sport. There are loading cleaning kits available, and modern rifles clean just like a bolt- rifle. But one tried and true method , good old hot water.

:p an old 2-quart pot that's my desig- lack powder pot. I put some water in on the stove, and right before it begins I take it off and set it on a potholder loor. I place the muzzle in the water ough the breach end, insert the clean- , with a jag attached and cloth patch and just start scrubbing back and replace the patch after each pass until ch stays clean. The hot water breaks ne powder residue. You can feel the warming up, but that's okay. Swab it dry patch and look through it. If it's hen swab a patch that has some bore o prevent rusting. I usually he rifle after target prac- l after the season is over.

r movements may be a fferent now than in rifle . The rut is not on, so primarily around food s. This time of year, the ood source is white oak . Almost everything in ods eats them, but deer em. My mentor, the late ollins (see "My Friend Dec. 2010 *WINC*), used me that deer feed on oak acorns twice a day. ite oak acorns can also rse. If you're hunting a f property that has an ance of acorns, it may d to find which trees er are coming to. This re preseason scouting luable.

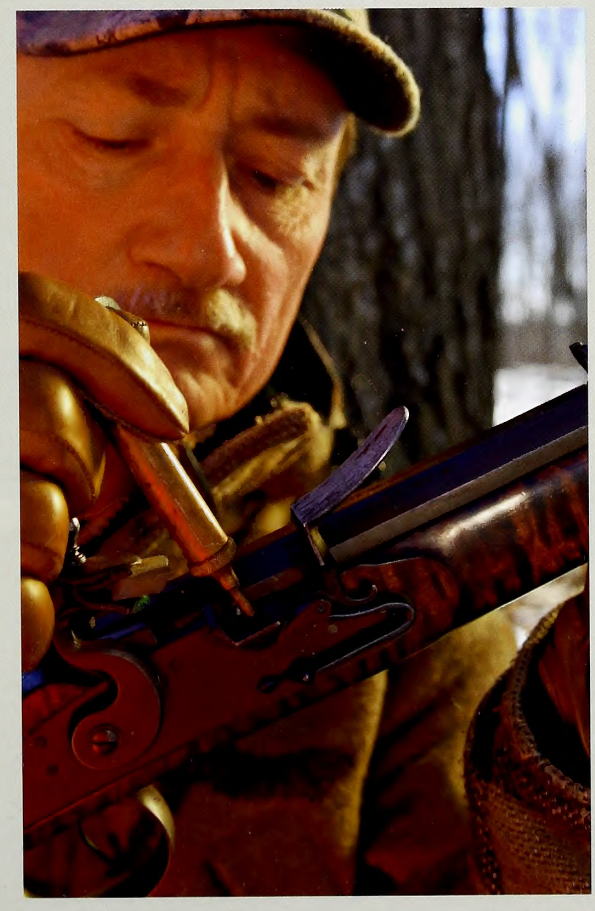
k for trails that are ng what looks like the ecent traffic, and try rmine which direction cks are going. If it looks e tracks are heading into ts, they may be bedding nd that might be a good g stand location. If you me white oak trees where s an abundance of deer sign, that might be a good evening stand location. If it's a relatively warm day, the deer might come out right at dusk.

Sometimes you can search ridges and find buck sign. Bucks start rubbing in September, so it's possible to find fresh rubs. Again, look for trails that have the most recent activity. It's possible to see a buck slipping along heading to a bedding area after eating some acorns. My brother, Jason, harvested a nice 7-pointer one muzzleloading season. He thought he saw the deer one evening at dark, so he set up in the same stand early the next morning. Sure enough, that old buck reappeared. In that particular situation, we found both acorns and buck sign. Evidently the buck and some does were both visiting those acorns regularly, because later that same evening, Jason harvested a nice doe. A game camera is a very good aid; this will take some guesswork out of a piece of property. With a camera, a hunter can see what animals are actually there, and the times they're coming.

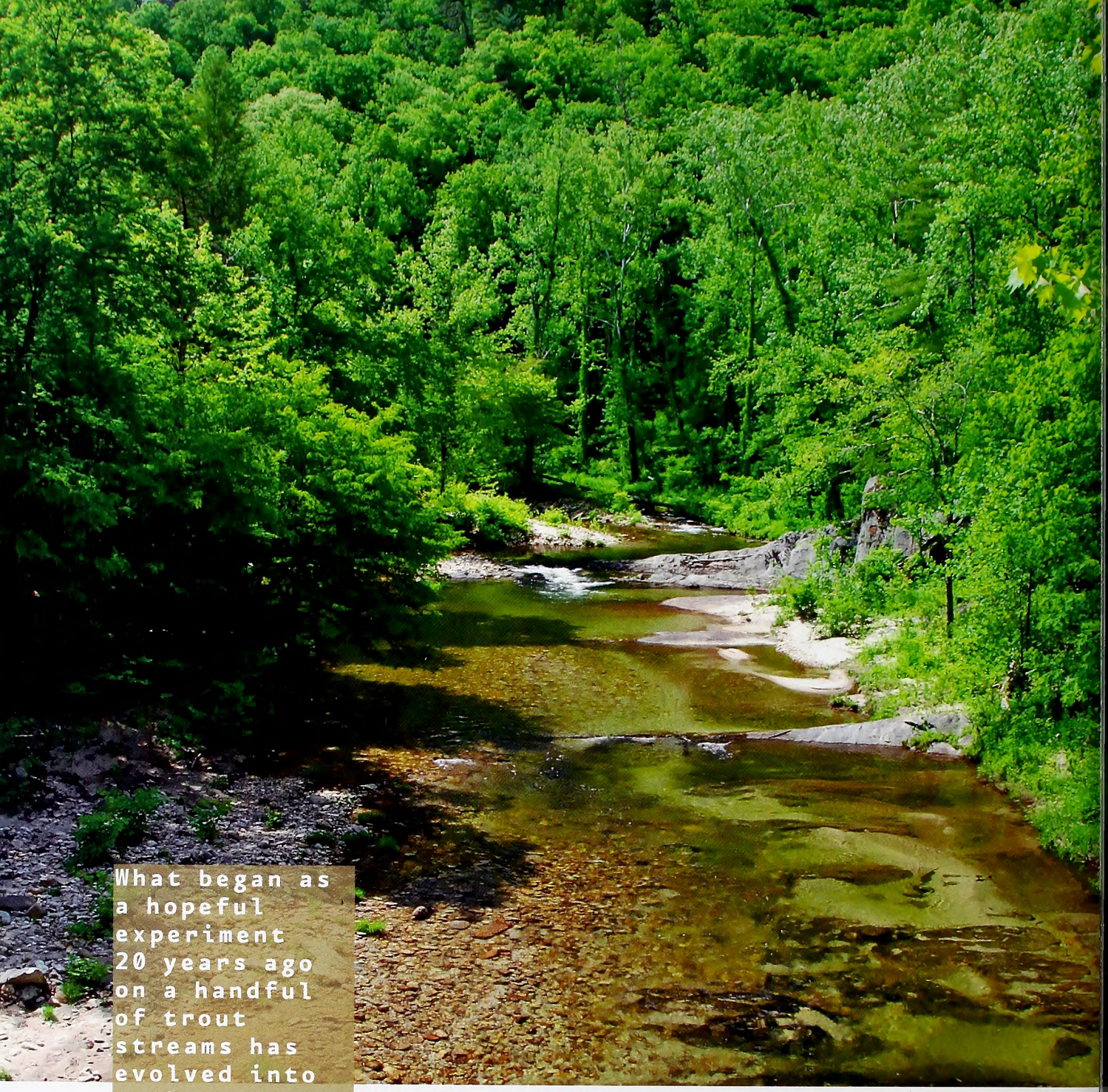
Muzzleloading season can sometimes be warm in the afternoons. I'll admit to swatting mosquitoes while on stand. This is one of the reasons I wear gloves. An inexpensive cotton pair will do. Also, I wear some sort of lightweight head net. I can still hear them buzzing, but I won't feel them biting quite so much. The other thing about the warm afternoons is that if you're lucky enough to harvest a deer, you will need to get the entrails out and the meat cooled off quickly.

With today's muzzleloaders and longer seasons, the hunter's odds for tagging a whitetail have vastly improved. And it's a wonderful way to kick off your hunting season. I wait all summer for it. There's something special about the solitude of sitting in a tree, surrounded by the beautiful coloration of the leaves, waiting for a deer to come by. It doesn't get much better than that.

Morganton's Jeremy Grady is a freelance writer and frequent WINC contributor.



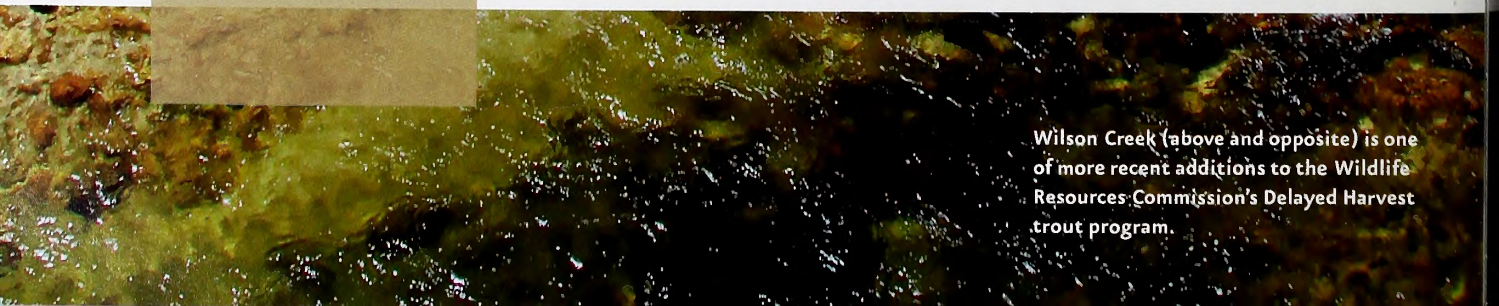
Some hunters prefer hunting with the older style muzzleloaders which require use of such as tools as nipple picks (left) and powder horns.



What began as a hopeful experiment 20 years ago on a handful of trout streams has evolved into an immensely popular program that benefits both our environment and economy.

DELAYED HARVEST DELIGHTS

Written and Photographed By Jim De



Wilson Creek (above and opposite) is one of more recent additions to the Wildlife Resources Commission's Delayed Harvest trout program.

The crests of the mountains that day in the early 1990s were a pale green with splashes of pink and white from redbuds and dogwoods as I headed north out of Wilkesboro. I was bound for a small stream that originates high up near Wildcat Rocks on the Blue Ridge Parkway and tumbles southeast through mature forest until it links up with the Middle Prong of Roaring River in the valley. I had fished it before, and knew it held a good population of mostly small wild rainbows that were prospering under special Blue Ridge Parkway regulations that permitted only artificial lures or flies and restricted the number of trout that could be kept.

I pulled into the parking area, gathered my gear and began the long hike up the trail to get to the more remote portions where I hoped I might not encounter other anglers. The wild trout in these small streams can be notoriously spooky, and they're nearly impossible to catch if someone is fishing ahead of you. Everywhere I wanted to fish, however, I ran into other fishermen or soon realized I was following fresh footprints—not surprising since it was a glorious spring weekend.

By mid-afternoon, I had yet to catch a trout. It was too late to drive to another similar wild trout stream (I had only one day to fish), so I began the long walk back to the car, beaten and dejected.

Maybe I ought to check out the Middle Prong before I leave, I thought. I had driven alongside it coming up the valley, but I hadn't paid much attention because I knew it was somewhat marginal water that held mostly hatchery trout stocked by the N.C. Wildlife Resources Commission. Besides, I had seen lots of fishermen. But it was my last resort, and I also knew that it was one of a handful of streams that the Wildlife Commission had recently introduced under a new experimental regulation called Delayed Harvest.

I pulled off the gravel road and watched several fishermen. Most were using spinning tackle, but one was fly-fishing. It was quickly evident that they were catching trout regularly, including an occasional sizeable one.

"Looks like you guys are doing pretty well," I said to one older fisherman who was taking a break sitting on a nearby rock.

"Yeah, I really like this deal," he replied. "I don't get around too well anymore, but this water is easy to get to, and there are always lots of fish. I don't mind turning them loose now, either, especially since I'll be able to keep some later in the year. It's about the only place I fish for trout anymore."

I drove slowly until I found an unoccupied pool, thinking I might try it for an hour. So what if these were hatchery fish and relatively easy to catch? Like that older angler, I also didn't mind releasing them—that's what I would have done with those wild fish I'd been stalking earlier. The afternoon slipped away gently, and it was nearly dark before I finally tore myself away—and well past midnight before I got home. It hadn't been the remote, wild trout experience I'd been seeking, but I had to admit that it had been lots of fun, and something I would surely try again.

Some 20 years have passed since that day, and it's a pretty good bet that every trout fisherman in North Carolina now knows how this experiment turned out.

The Wildlife Commission's Delayed Harvest program has since expanded to 21 streams and one lake as of this writing, with two more streams proposed for addition. More waters are almost sure to be added in future years. (A list of all Delayed Harvest waters and their locations, along with applicable regulations, can be found in the *2011–2012 N.C. Inland Fishing, Hunting and Trapping Regulations Digest*.)

Brothers Larry Kapps (left) of Mooresville and Ken Kapps of Denver finish a day on Wilson Creek. Ken estimates he fishes the stream about 150 times a year.

"The Delayed Harvest trout program is by far the Wildlife Commission's most popular fisheries program, and may even be the most popular program of any type we've ever offered," says Doug Besler, mountain region fisheries supervisor.

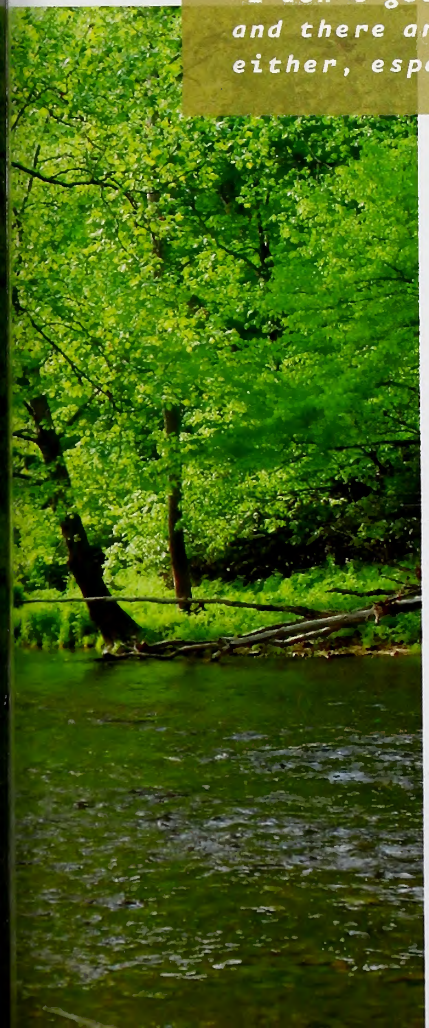
That is a truly impressive acknowledgement for a state agency that has been managing fishing, hunting, trapping and boating in North Carolina since 1947. Indeed, it seems almost miraculous that the relatively simple adjustments in regulations that make up the Delayed Harvest concept could achieve such enormous popularity, not to mention many other

ts, including some that reach beyond
g to enhance local economies.
e current Delayed Harvest regulations
le that fishermen must release all the
hey catch from Oct. 1 until the first
lay in June, and they are restricted to
only a single-hook artificial lure (or
owever, beginning on the first Saturday
e, fishermen can keep seven trout a day
t by hook and line, with no size restric-
and no bait or lure restrictions. Nor are
any restrictions against the use of bait
es. These regulations apply through
30 of the same year, and on Oct. 1, they
revert to catch-and-release using only
le-hook artificial lure.
ne change that went into effect this past
ner is that from 6 a.m. to noon on the
aturday in June, the opportunity to fish
eep a limit of seven fish is restricted to
s under age 16, and they don't need a
g or trout license (licensed adults can
npany them, but cannot fish during the
-only period. At noon, that opportunity
extends to all fishermen and lasts until Oct. 1. As you would expect, adults fishing these Delayed Harvest streams need a valid resident or non-resident fishing license, as well as a trout license.

At a glance, it's a very simple concept. Fishermen can fish eight months knowing that the water they are fishing is full of trout. The Wildlife Commission stocks these streams heavily with triploid (sterile) trout, and some larger trout are included. Incidentally, all Hatchery Supported and Delayed Harvest streams are now stocked entirely with triploid trout in North Carolina to protect wild stocks, particularly native brook trout (See "Fish by the Millions," June 2011 *WINC*).

During the period when trout must be released, fish stocked into these waters remain available to catch (some incidental mortality among released trout is unavoidable, but the majority of fish survive to be caught again). For the remaining four months, a daily limit of those trout can be caught and kept. Then the cycle repeats. Call it Delayed Harvest, deferred compensation or having your trout and eating it, too, it has worked wonderfully.

"I don't get around too well anymore, but this water is easy to get to, and there are always lots of fish. I don't mind turning them loose now, either, especially since I'll be able to keep some later in the year.



An angler (above) catches and prepares to release a Wilson Creek rainbow. The Watauga River (left) is an accessible and handsome piece of Delayed Harvest water.

The Delayed Harvest program does not affect or change the way the many other trout streams and waters are regulated and managed in North Carolina. There are still vast miles of Hatchery Supported streams, and also many miles of streams managed for wild trout, some of which are restricted to pure catch-and-release. Since these classifications of streams are not our subject, however, we won't get into the Wildlife Commission regulations that govern them (these are also explained in the *Regulations Digest*).

One of the most important elements of the Delayed Harvest program is that it adds to the total mileage of trout water in the state. Wildlife Commission fisheries biologists make every attempt to evaluate and select streams to add to the Delayed Harvest program that aren't already in the state trout management program.

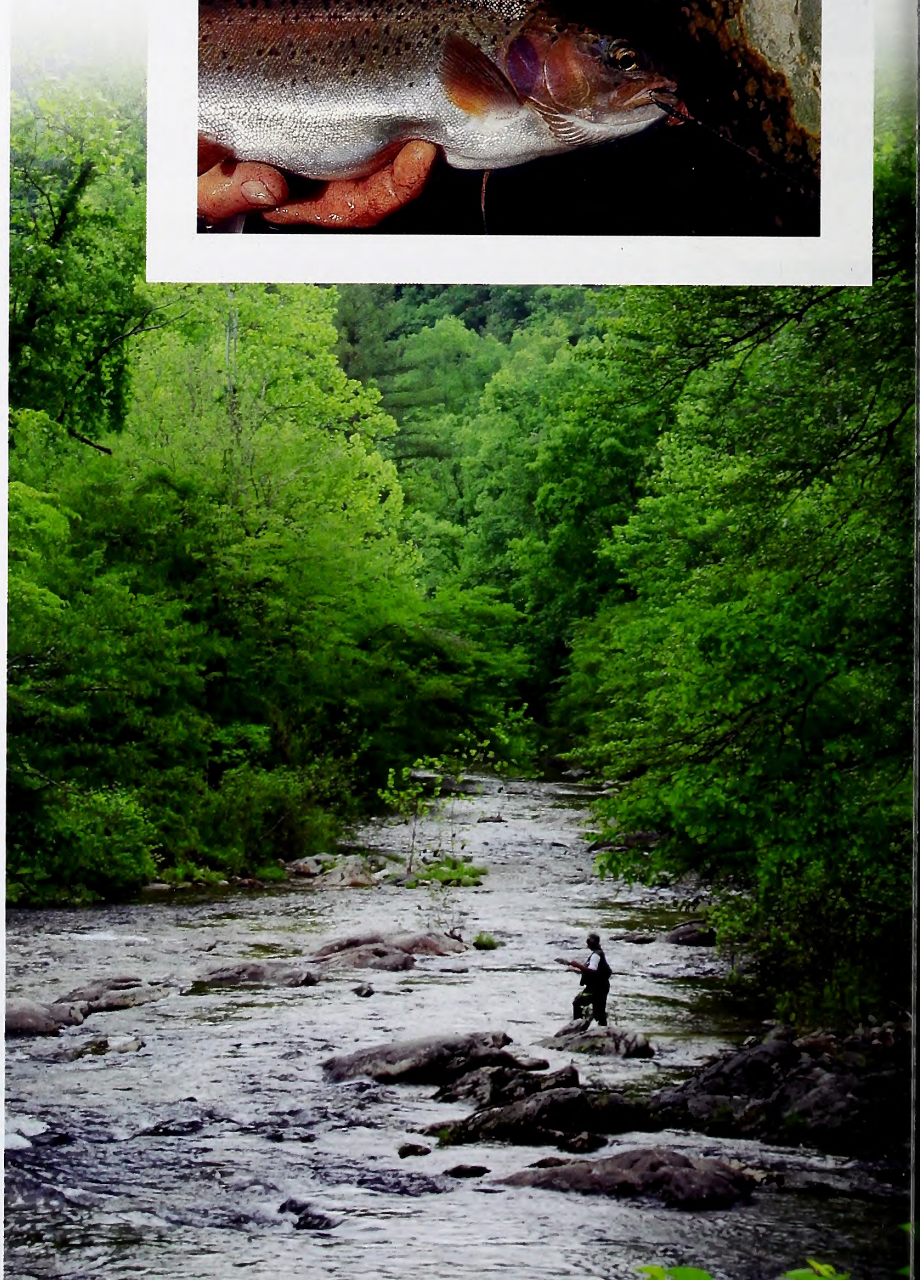
"For Delayed Harvest streams, we make a conscientious effort not to reduce the mileage of our hatchery-supported streams, but instead look for streams or stretches of streams that can be new acquisitions," explains Besler. "Typically, this is water that is marginal trout habitat that may get too warm in the summer to sustain a successful streambred population, but we want it to remain cool enough to keep the hatchery trout we stock alive. We're also looking for water that is easily accessible to lots of fishermen.

"A good example is the North Toe River. Spruce Pine suffered a lot of damage in the flood of 2004, so we worked with the town to get public access to 2 miles of the North Toe that flows through Spruce Pine to add to the Delayed Harvest program.

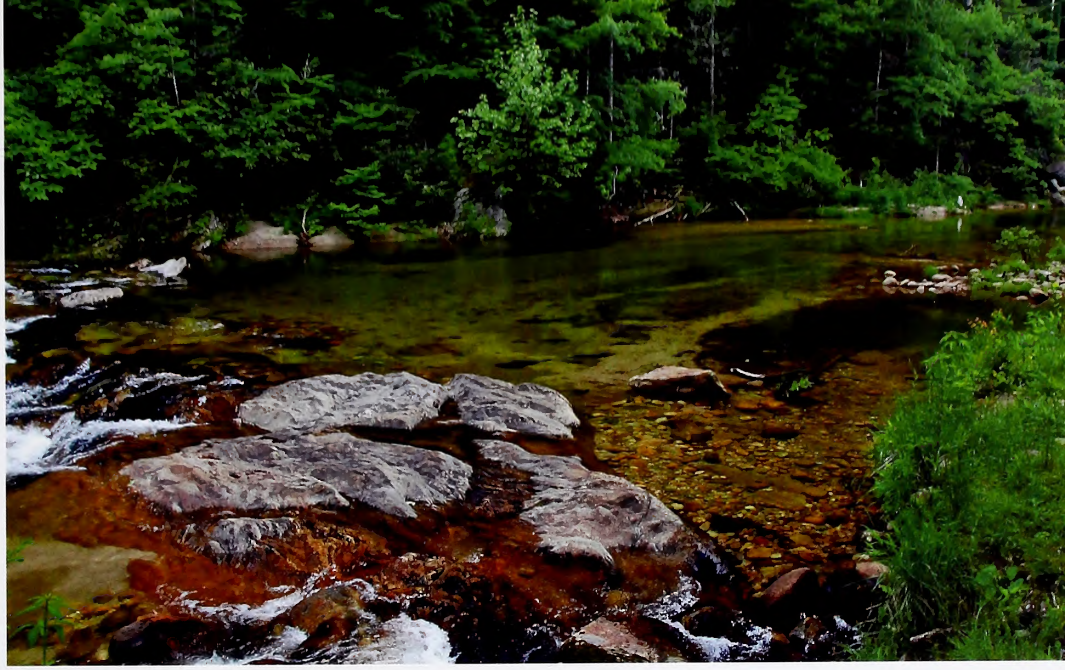
"We worked out the same sort of arrangement on Mill Creek at Old Fort," said Besler. "Another good example is the 3½-mile stretch of Wilson Creek that was part of a significant land acquisition made available through the generosity of the O. P. Lutz family. This was not previously public water, but it is now in the Delayed Harvest program, and it's extremely popular. These Delayed Harvest waters have added a new dimension and greater fishing opportunity to our overall program."

Some of the benefits provided by the Delayed Harvest waters were anticipated, but some have been a pleasant surprise. The streams are typically selected because they are accessible and generally easy to fish. That makes them especially popular among

In addition to many large, deep pools, the Delayed Harvest stretch of Wilson Creek also has lots of productive runs and riffles.



nen who might not have time, or be
ally able to hike into remote streams.
is typically difficult to provide oppor-
s for disabled fishermen on streams,
've been able to make handicapped
possible on some Delayed Harvest
is, and we're looking to do more of
says Besler.
ayed Harvest waters are also terrific
for any newcomer to learn to fish,
ally with a fly-rod. During the eight-
period when trout must be released,
e also ideal places to introduce young-
) the sport, because it's an almost sure
it they'll catch fish.
ds usually haven't fished enough to
p a lot of patience, so catching fish
rom the start keeps them interested
elps build confidence," says Besler.
act that Delayed Harvest streams are
ear round is also a plus. No matter
he weather is like, there always seem
ishermen out there."
ere are also environmental assets to
d Harvest that some early advocates
not have anticipated. For example,
nen who generally prefer to fish wild
streams (and especially those who are
ates of catch-and-release) appreciate
elayed Harvest waters for another
n — these fishing spots are so popular
ey tend to draw some of the fishing
re away from more fragile Wild Trout
. Many fishermen believe that fishing
sh populations on some Wild Trout
may be improving as a result.
rdly anyone, however, anticipated the
rdinary economic benefits that Delayed
st waters have created.
'e estimate that 130,000 anglers fished
ut in 2008 in North Carolina," says
. "Trout fishermen spend an estimated
million dollars a year in this state to fish,
at doesn't include trout fishing in the
Smoky Mountain National Park or at
erokee Indian Reservation.
lot of this can be traced to the immense
arity of the Delayed Harvest program.
imate that a Hatchery Supported stream
butes about $600,000 each year to
cal economy, while a Delayed Harvest
n is worth $2.2 million to the local
my. Where there are towns that have
is running through them, or nearby,
worked hard to encourage those com-
ies to provide public access to that



The 3½-mile stretch of Delayed Harvest waters on Wilson Creek is not only productive, but beautiful. Previously this was private water.

water for angling opportunities. We're having some success because these waters can be a real asset to localities that have experienced a period of economic decline. All we ask of them is that they grant guaranteed public access to the water."

An important thing to remember is that virtually all wild trout water is on public land (national forests, parks, etc.), while 85 percent of stocked streams are on private property. Thus, when a community can work with cooperative landowners to grant stream access on private holdings for a local Delayed Harvest stream, everybody wins. Fishermen get an easily accessible place to fish where the fishing is almost always terrific, and the community reaps the economic benefits from all those visiting anglers.

With North Carolina's population growing, and more and more fishermen arriving from other parts of the country to live here, the Delayed Harvest trout program and its solid economic benefits are almost certain to continue to increase.

How, you might wonder, did all this get started? Besler credits former fisheries biologist Jim Borawa for suggesting that such a program might work here.

Borawa was stationed in Asheville as the Wildlife Resources Commission's cold-water research coordinator when he became aware that Pennsylvania was experimenting with a fledgling Delayed Harvest program — the first ever in the country. Borawa thought the idea showed promise, and he recommended that North Carolina consider giving something similar a try.

The first Delayed Harvest streams in North Carolina were proposed for the 1992 season, but the program was limited to only the spring months. Fishermen liked it from the beginning, however, and there seemed to be no unforeseen problems. Indeed, it even proved viable from a fisheries management standpoint. It was cost efficient, sites were easy to stock and there was a more favorable catch rate of stocked fish that were never expected to survive anyway (what an economist might call "a good return on investment"). In 1996, the Delayed Harvest concept was expanded to fall and spring, and since that time it has evolved into the current program and grown steadily.

Indeed, Besler and others in the Commission believe that Delayed Harvest has a long way yet to run. "There's still a lot of potential out there," said Besler. "There are streams and small lakes scattered throughout the western part of the state that could prove suitable for Delayed Harvest. Communities like Spruce Pine and Old Fort are already enjoying the long-term benefits Delayed Harvest streams can provide, and others can, too."

Perhaps the only odd thing about this is the realization that there is a government-sponsored program that apparently has nearly universal and enthusiastic acceptance. Some might argue that this is as rare as going fishing and knowing that you're almost sure to catch something. ◆

Jim Dean is the retired editor of Wildlife in North Carolina *and writes the long-running "Our Natural Heritage" column each month.*

Despite concerns about wind energy's effects on wildlife, researchers believe the impacts can be kept minimal.

Wind Energy and Wildlife

Can we catch the wind without winging the birds?

written by John Manuel

IN May 2011, the North Carolina Utilities Commission gave its approval to the so-called Desert Wind Energy Project to be located near Elizabeth City. If the project gets similar approval from other state, local and federal agencies, the flat farmland west of the NC 17 bypass will sprout 150 turbines, each one more than 400 feet tall. Collectively, they will produce 300 megawatts of electricity, enough to power 55,000–70,000 homes.

Wind has become the second-largest source of renewable energy in the U.S., providing 40,000 megawatts of electricity in 2010. Wind is a clean source of energy and, in some parts of the country, is competitive with electricity generated by fossil fuels. The majority of wind farms are located in the western and plains states where winds are strong and the land is sparsely populated. But the East Coast is entering the game, primarily because of the potential for near-shore and offshore wind development. Few states are better situated to take advantage of this than North Carolina.

A recent study by the National Renewable Energy Laboratory states that North Carolina has a wind resource of 140 gigawatts (1 gigawatt = 1 billion watts) within 50 miles of shore. That is more than twice the resource of any other state on the Atlantic seaboard except South Carolina at 86 gigawatts. Wind turbines can be erected in water 35 meters deep and more. In North Carolina, that translates into distances up to 50 miles offshore, out of sound and potentially out of sight of land. But before we throw our support behind a wind energy project on land or in the water, North Carolinians need to know what the potential impact will be on our other great natural resource—wildlife.

In general, wind turbines' impact on wildlife seems to be small. Whirling blades, whose tip speeds can reach more than 200 miles per hour, are the biggest concern, and birds and bats the principal victims. Studies indicate that mortality averages about three birds per turbine per year—a relatively insignificant amount. But some sites have proven to be virtual Cuisinarts for flying creatures. In the space of two months, biologists found more than 400 dead hoary and eastern red-tailed bats at the foot of West Virginia's Mountaineer Wind Energy Center. They concluded that the center's 44 turbines were killing between 1,400–4,000 bats per year. Studies of California's Altamont Pass Wind Resource Area show those turbines kill an average of 2,710 birds per year, including 1,127 raptors.

Impacts on wildlife are not just limited to the turbines. Each utility-scale wind turbine requires about an acre of cleared land around it, half of which will be an impermeable surface. Roads must be constructed to build and maintain the machines, and power line corridors cut to transmit the energy to a substation. In forested areas, all this land clearing can destroy a lot of wildlife habitat.

These and other factors would seem to preclude the construction of a utility-scale wind farm in the North Carolina Mountains. Numerous ridgelines throughout the 24-county Mountain region have adequate winds

to support utility-scale wind generators. But tourists and locals alike cherish their views of these ridgelines unadorned with man-made structures. A state law, the Mountain Ridge Protection Act, bans structures more than 40-feet tall on ridgelines at elevations of 3,000 feet or above. While the law exempts "windmills" from this restriction, the state's attorney general has interpreted this to refer to small-scale windmills, not utility-scale wind generators. Some local governments, including Ashe County and the Town of Blowing Rock, have raised the bar by passing laws specifically prohibiting utility-scale wind farms within their jurisdictions.

Wind developers say these laws send a message that developers should seek to locate projects elsewhere. "Our philosophy is that we want to be welcomed as a good neighbor," said Robert Propes of Virginia-based Apex Wind Energy, Inc. "If we're not going to be welcomed, that's not a battle we want to fight."

Apex and a host of other wind developers are focusing their efforts on the North Carolina coast, an area with steady winds and wide open spaces. Iberdrola Renewables, the developer of the Desert Wind project, is excited about its site in Perquimans County. "It's open agricultural land, mostly soybean and cotton fields," said Michael Clayton, permit manager for Iberdrola. "Farmers will be able to plant crops right up to the base of the turbines, so we won't be taking much land out of production." Iberdrola is reportedly paying landowners $6,000 a year for each tower they agree to host on their property.

As of this writing, Iberdrola had not completed its assessment of potential wildlife impacts of its project. Point counts of birds done at the site in the fall of 2010 revealed "nothing earth-shattering, mostly resident species like catbirds" according to John Stanton, Migratory Bird Specialist with the Southeast Region of the U.S. Fish and Wildlife Service. Stanton n that many passerines (neo- ical songbirds) migrate thr the area in the fall and spri flying mostly at night and descending into forested ar along the nearby Perquima and Pasquotank Rivers du the day. Because the wind t bines will be located in ag cultural fields, Stanton is n overly concerned about th impacts on these birds.

> "The intense survey of birds and other wildlife tells us where the organisms are by season and how abundant they are, but we cannot know how they will react behaviorally to the spinning rotor of a wind turbine from surveying a seascape lacking wind turbines"
>
> —Pete Peterson, professor at the UNC Institute of Marine Studies

Migrating waterfowl are another issue. Joe Fuller, Migratory Bird Coordinat with the N.C. Wildlife Co mission, says that 3,000–6, tundra swans forage each w ter in the complex of fields where the wind farm is plan An equal number of snow g use these fields intermitten "We do not know how the birds will respond to the w turbines," Fuller said. "It m be that they will have to g somewhere else to feed."

Fuller suspects Desert W by itself will not pose a ma problem to wintering wat fowl. His concern is what w happen if wind farms proli ate throughout the agricult areas of northeastern Nort Carolina. "It could have a sn ball effect to where these bi start to lose safe, secure for ing areas," Fuller said.

To help developers, poli makers, and citizens unde stand the potential for wi energy on our coast, the General Assembly in 2008 commissioned the Univers of North Carolina at Chap Hill to do a study assembli all relevant information. O the next nine months, a tea of more than two dozen fac staff and consultants search scientific literature, assemb data and interviewed every from Danish wind experts local anglers and bird watch

sult is "Coastal Wind: Energy for Carolina's Future," a 370-page doc- t crammed with data and maps on hing from wind speeds to military ce to the location of oyster beds on rth Carolina coast. Included in this are 25 pages on wildlife impacts. th respect to avian species, the authors ed information on the abundance and l patterns of birds along the coast (it t look at inland areas). The study divid- ls among migrating passerines, winter nts and summer residents. zards to songbirds are of particular con- is surveys show some of these species n dramatic decline nationally. Song- migrate along the North Carolina coast ing and fall, generally flying at eleva- above the tops of utility-scale wind es (400 feet). However, songbirds p lower on take-off and landing and g harsh weather, so turbines located near shore could present problems. irds are also attracted to lights, so the ican Bird Conservancy and the U.S. Wildlife Service both recommend ind turbines be illuminated with strobe rather than continuous beams. nter and summer residents found on or he coast include half-a-dozen guilds spectively include cormorants; ducks, and swans; gulls and terns; raptors; birds; and colonial roosting wading The first two groups make frequent vel flights as they move among foraging and this could potentially make them rable to wind turbines. However, the rs cite studies of offshore wind farms rope showing that geese and ducks see rbines and learn to avoid them. mbers of the third and fourth guilds le a number of fish-eaters. As with oil ffshore wind turbines act as "artificial " attracting fish in large numbers. The n turn, will attract gulls, terns, and pel- To minimize possible collisions, the rs recommend that wind turbines be ned without any horizontal ledges that serve as perches or nesting sites.. e authors state that shorebirds and colo- oosting wading birds should not be at risk if wind farms are located in water r than 4-6 meters, the minimal depth d for installation barges. However, they hat some wading birds make relatively ross-water movements from night- oosts to foraging grounds. Placement of farms in these routes should be avoided.

Given the experience with bats in West Virginia and elsewhere, wildlife officials are concerned about these species of mammals. Wind turbines appear to attract insects and with them, bats. The authors presume that the farther offshore a wind farm is located, the less likely it is to be a threat to bats, but they say there is little data to support that assumption.

The study addressed possible impacts on marine mammals, including dolphins, whales and manatees. The authors state that the mere presence of a wind turbine is unlikely to pose a threat to these animals.

After compiling all of the information on distribution and behavior of birds and bats over the coastal waters of North Carolina, the authors constructed a map indicating likely areas of high risk, moderate risk, and low risk for negative interactions between wind turbines and aerial fauna. The authors designated as high risk a buffer zone extending 2 miles out from all sounds and ocean shorelines. That buffer is intended to protect passerines, shorebirds and bats on takeoff and landing.

The entirety of Albemarle Sound and much of Pamlico Sound—prime overwintering grounds for ducks and waterfowl—is also classified as high risk, along with the Alligator River, Pea Island, Cedar Island and Swan Quarter National Wildlife refuges. Inlets, which are known hotspots of biological activity, have been classified as high risk to a distance of 5 miles from the center of the inlet. Large zones off of capes Hatteras, Lookout and Fear are also designated as high risk.

The authors also compiled a map to identify and protect key fish, fishery and marine habitats. Offshore wind turbines can actually be a boon to fisheries through the artificial reef effect. Approximately 48,000 square feet of rock are placed at the base of wind turbines to prevent scour. In near-shore environments, these rocks would attract oysters and mussels, and their predators, namely sheepshead and black drum. In the ocean environment, these rocks would attract bottom dwellers such as snappers and groupers, and pelagic predators such as king mackerel. In other areas, however, the construction could damage or interfere with fishing and fish habitats. High Risk areas include primary and secondary nurseries, strategic habitat areas, artificial oyster reef sanctuaries, shell bottoms, live bottoms, wreck habitats and submerged aquatic vegetation.

For all the information they gathered, the authors of "Coastal Wind" point out that the conclusions they reached about possible interactions between wind turbines and wildlife are largely hypothetical.

"The intense survey of birds and other wildlife tells us where the organisms are by season and how abundant they are, but we cannot know how they will react behaviorally to the spinning rotor of a wind turbine from surveying a seascape lacking wind turbines," said Pete Peterson, professor at the UNC Institute of Marine Studies and one of the lead authors of the study. "There's a lot we don't know about things like risk to birds at night and the effect of lights.

"At the same time, we don't know what mitigation procedures we could successfully use, like painting turbines different colors to make them more visible or using strobe lights instead of continuous lights so as to attract fewer birds at night. Overall, I think it's fair to say that we will be able to find places over the eastern Pamlico Sound and coastal ocean where we can use wind energy without undue impacts on wildlife." ◆

Freelance writer John Manuel is a longtime contributor to Wildlife in North Carolina.

the **FASCINATION** began at *five*

Written by
BRUCE INGRAM

Illustrated by **GARY PALMER**

Beginning with early secretive trips, fishing captured the imagination of a young boy and never let go.

At the age of five, I began a lifelong fascination with the magic of moving water, sneaking away from my parents' house and slinking down to Gish's Branch (an incredible distance of 150 yards), where I seined minnows with a window screen. Minnows with brightly colored sides I labeled rainbow trout; every minnow with fat sides I called a sunfish; every other finned creature was lumped into the generic category of bass. I also built small rock dams, where I corralled fish and was always mystified when they had not stayed put after I came back a day or two later.

By the time I was 9, I had begun riding my red Schwinn a whole mile down to a Roanoke River tributary, which Gish's Branch emptied into. For a few glorious weeks, I caught chubs and redbreast sunfish by dangling chunks of worms (several rainy mornings they had made the mistake of lingering too long after sunrise on our driveway) beneath a golf-ball-size red-and-white bobber. But I soon became desirous of bigger quarry.

A peer had regaled me with tales of incredibly sized fish—he called them smallmouth bass—that reached a fantastical 10 inches long and swam in a pool another half a mile distant from home. I became obsessed with taking this trek and finally succumbed to the wanderlust that exists in many young boys—and no doubt in many girls as well.

I arrived at the pool one sunny Saturday morning and hurled a gob of crawlers toward the heart of the hole. I reasoned that bigger fish would want bigger bait, not a bad maxim, really. However, a sycamore intercepted the squirming mass—something that trees still do today. Unfortunately, this sycamore was no ordinary one, as a hornets' nest resided in its lower limbs, and the winged attackers soon found the source that had disrupted their universe.

Covered in stings, I knew that I would not be able to conceal from my mother's prying eyes what had happened. Since my parents' wrath was now assured, I decided to move downstream, catch some sunfish, bring them home and demand them for dinner.

My parents did not like fishing or fishermen. Earlier, Dad had pronounced, "Boy, you'll never make any money fishing," and mom had said that all fishing would earn me was "bee stings and snakebites," and she was half right already. Both had proclaimed that fishing was the pastime of idlers, wastrels and ne'er-do-wells.

Of course upon my arriving home, Dad whipped me with several prime switches cut from our forsythia (it was debatable whether the stings or the switching hurt worse), but Mom cooked the sunnies. Depression-era survivors, they felt it was a sin to waste good food.

It was afterward, and after much reflection and nursing of my many wounds, that I came to one of those proverbial forks in the road: whether to obey my parents' commands regarding fishing or blatantly disobey them. Some words from Mark Twain's "Huckleberry Finn," spoken by a boy about the age of me, neatly sum up my dilemma and what fork I decided to take.

"I was a-trembling, because I'd got to decide, forever, betwixt two things, and I knowed it. I studied a minute, sort of holding my breath, and then says to myself: 'All right, then, I'll go to hell.'

"It was awful thoughts and awful words, but they was said. And I let them stay said; and never thought no more about reforming."

So as soon as a respectable amount of time had passed after the hornet incident, I resumed sneaking away to ride the Schwinn down to the creek. The

My parents did not like fishing or fishermen. Earlier, Dad had pronounced, **"Boy, you'll never make any money fishing,"** *and mom had said that all fishing would earn me was* **"bee stings and snakebites,"** *and she was half right already.*

problem became, though, that I could not catch any of the smallmouths, causing both my frustration and my fascination and obsession with this game fish to grow.

Day after day I would hurl the conglomeration of worms out to the creatures, and day after day they would ignore the mass. I have always suspected that my parents knew I was disobeying their strictures, but they seemed to have come to a tacit understanding that I could not be dissuaded from fishing. It was as if they had given up hope of my ever having a respectable hobby.

Five years passed, and I became adept at catching rock bass, redbreast sunfish and even chain pickerel, but still no smallmouths. It was then that I sought out the wisdom of a very worldly 16-year-old, practically a man, who had been rumored around school to have caught a half dozen or maybe even more bronzebacks during his long angling career. His name was Rick, and he also possessed a car, a blue 1957 Ford station wagon, which gave him access to a countryside far more remote than what I could travel to on my bike.

Rick promised to take me stream smallmouth fishing, and on a May Saturday we deposited our rods (mine the classic Zebco 33 spincasting outfit, his one that I had never seen but had heard about — a spinning rod) in the station wagon. Rick's destination was the same creek that was my home water, but his favorite fishing hole was 10 miles farther away and up and over a mountain.

When we arrived, Rick proudly opened an Old Pal tackle box, and inside was an incredible array of fishing gear. The box contained the same types of bobbers, hooks, swivels and sinkers I possessed, also flaunted what seemed an astronomical nun of lures, six in fact, that Rick explained his dad given him over a period of years. They included t Mepps spinners with gold, silver and bronze bla (my mentor revealed that he used different-colo blade baits for different-colored water), two red- white Daredevil spoons, and something he calle Shyster spinner that sported squirrel hair attach to its treble hooks.

Rick offered to let me use the Shyster but wa that I would have to pay him two bits (a quarte I lost it. He then said that I was to fan cast — a te new to me that Rick explained meant casting t different spot each time in a systematic manner

For some 45 minutes, we hurled our respect lures around the creek, with my Shyster produc no better than Rick's Daredevil. But the whole e rience was intoxicating to me, as surely this w the euphoria that came with being part of the ad world of fishing.

And then the life-changing event occurred. I a solid thump on the line, the Zebco rod bowed yards away a monstrous fish cleared the surface. yelled "Big smallmouth on," and I frantically ho in the leaping, lunging creature, beached it an grabbed the flopping fish.

Rick took a tape measure from his tackle box soon pronounced that the smallie measured 9 inc a lunker for sure. He also declared that I was t release the smallmouth, as the species was not t casually creeled like sunfish and chubs, that h were special and could be caught over and over ag perhaps even by me. Trembling, I freed the brow bass, an experience that made me feel good insi and hopeful that I would indeed catch that same again. The release also had the tangential benefi eliminating the evidence that I had been fishing

I immediately offered to buy the Shyster fr Rick. He declined, saying that I couldn't possi have enough money to acquire the lure, but af wrangling for some minutes, I finally purchased for 50 cents. Later, on the way home, I determi that I could hide the Shyster from my mo by depositing it under my bed. Many of t peers had begun hiding "girly magazi under their beds; my equally sinful secret was to conceal an assortme of fishing lures.

Being two years olde than I was, Rick had li ited time to spend wit 14-year-old like me. I had witnessed how m a vehicle could increa one's chances for angli

ess, and I knew whose wheels could help me
ve it—my Granddaddy Willie's.
rowing up, I had two role models: University of
h Carolina basketball coach Dean Smith, who
greatly influenced the way I teach high school
ents, and Granddaddy Willie. The latter did
are anything about fishing, but he also did not
ve of how his son, my father, would rail against
d refuse to take me.
that summer, Granddaddy and I planned an
secret excursion to the New River. Granddaddy
ly gave me some money, which I used to buy a
hat even Rick did not possess—a Rebel Min-
a classic hard-plastic stickbait. On the day of
dventure, Granddaddy picked me up and told
arents that we were "going riding" (an extremely
st man, he would never have lied to my parents,
e understood the wisdom of concealing the
n), drove us to the New River, said he would
h me from the shore, and told me to go wade
ng and have fun.
ll those formative years of wading Gish's Branch
d me well that day on the New, as I already knew
to drag my feet across the substrate slowly and
y, so as not to disturb the multitude of creatures
lived there or create the ripples that would alarm
nearby smallmouths. For three hours, within
of my grandfather, I waded the New, using the
l to catch two fine smallmouths, an honest
her and one slightly smaller. In my angling
, I now felt that I truly could refer to myself as
ss fisherman.
When I became old enough to begin the process
rning a driver's license, I did so initially not to
girls but to broaden my fishing horizons. My dad
small used car lot from our house, so when I
ed a license, he allowed me to drive what he
laimed was the worst car on the lot, a shabby-
ing, red 1965 Chevy Malibu convertible that
ired gashes in its rollback canopy, signs of mul-
fender benders and a missing left rear hubcap.
ad knew I was using the car for my fishing
editions, and I knew he knew, but we never
e of the other's knowledge, so a sort of uneasy
e developed between us. But he did assert his
ntal authority after one ill-begotten trout-fishing
in which I drove a then-unheard-of distance of
iles from home.
wo buddies and I had decided to spend an April
rday at a trout stream, and we determined that
at the crowds we would rise well before sunrise
begin the long trek. On the way there, part of
Malibu's decaying canopy peeled off in the dark
landed who knows where. Soon after we arrived,
of my cohorts fell in the creek. I did the same
, and the result was that upon my arriving home, Dad found a car with part of its roof missing, wet seats and muddy floorboards. He sold the Malibu within a week and in its place gave me a car he called Goldfinger.

Goldfinger, so named in part because it was a yellow 1963 Ford, had a broken gas gauge and gobbled fuel like no other vehicle I have ever driven. It was named Goldfinger also because Dad had jokingly remarked that only the like-named James Bond character could afford to drive the Ford with its extravagant gas consumption.

Never knowing how much gas Goldfinger held in its tank, and knowing whatever there was inside would soon be expended, I was constantly stopping at filling stations to replenish the supply, and even then the car frequently ran out of gas while I was on my fishing trips. Thus Dad had once again hampered my wanderlust without ever saying a word.

Years more passed and I graduated from college, found a place to live and eventually became infatuated with a female who stirred my soul even more than smallmouths did—no small feat. For our third date, I asked Elaine to go smallmouth fishing with me. She said yes, and later she answered again in the affirmative when I asked her to marry me.

Now much has changed in my life. Besides becoming a teacher, I also became an outdoor writer, proving my father incorrect when he said I would never make any money from fishing. Mom even became quite proud of my writing, subscribing to magazines if they ran her son's stories and purchasing my books on river smallmouth fishing to give to friends.

Elaine and I have two wonderful children, and Sarah and Mark enjoy fishing, although they are not as fanatical as I am about this most marvelous pastime. We live on a rural property that a smallie stream flows through and own another parcel that features a headwater spring of the New River. And today, at 58, when I go fishing it is almost always to streams where I seek smallmouths and trout. Because for me, the fascination began at five. ◆

Bruce Ingram is a regular contributor to Wildlife in North Carolina *magazine. Contact him at be_ingram@juno.com.*

North Carolina Hunting Seasons 2011-2012

SPECIES		HUNTING SEASON	DAILY LIMIT	POSSESSION	SEASON
BLACK BEAR		See *Regulations Digest, P. 45*	1	1	1
DEER[1]			6	6[2]	6[2]
	Archery	Sept. 10–Sept. 30 (Eastern) Sept. 12–Oct. 1 and Oct. 17–Nov. 19 (Western) Sept. 10–Oct. 28 (Central) Sept. 10–Nov. 4 (Northwestern)			
	Muzzleloading	Oct. 1–Oct. 14 (Eastern) Oct. 3–Oct. 15 (Western) Oct. 29–Nov. 11 (Central) Nov. 5–Nov. 18 (Northwestern)			
	Gun	Oct. 15–Jan. 2 (Eastern) Nov. 21–Dec. 10 (Western) Nov. 12–Jan. 2 (Central) Nov. 19–Jan. 2 (Northwestern)			
	Urban Archery Season	Jan. 14–Feb. 18	*See Regulations Digest P. 55*		
WILD BOAR		Sept. 12–Sept. 30[3]	1	1	2
FERAL SWINE (HOGS)		No closed season or bag limits			
WILD TURKEY	Male Or Bearded Only Youth Hunt (Male Or Bearded Only)	April 14–May 12 April 7 *(statewide on private land)*	1 1	2 *(Annual bag limit is 2 wild turkeys.)*	2
EARLY CANADA GOOSE SEASON		Sept. 1–Sept. 30	15	30	None
DOVE	(Mourning & White-winged)	Sept. 3–Oct. 8 (noon until sunset on Sept 3; thereafter, shooting hours are ½ hour before sunrise until sunset) Nov. 21–Nov. 26 Dec. 17–Jan. 13	15	30	None

ES		HUNTING SEASON	DAILY LIMIT	POSSESSION	SEASON
MOORHEN & NULE	Moorhen & Gallinule	Sept. 1–Nov. 9	15	30	None
	Clapper Rail, King Rail	Sept. 1–Nov. 9	15	30	None
	Sora Rail, Virginia Rail	Sept. 1–Nov. 9	25	25	None
TEAL SEASON[4]		Sept. 10–Sept. 28 (east of U.S. 17 only)	4	8	None
ION SNIPE		Nov. 14–Feb. 28	8	16	None
COCK		Dec. 15–Jan. 28	3	6	None
GRAY SQUIRREL		Oct. 17–Feb. 29	8	None	None
QUIRREL		Oct. 17–Dec. 31 (only in 23 counties; season closed elsewhere; see *Regulations Digest*, P. 57)	1	2	10
IT ing Box Trapping		Nov. 19–Feb. 29	5	None	None
		Nov. 19–Feb. 29	6	12	None
ED GROUSE		Oct. 17–Feb. 29	3	6	30
SANT Pheasant Only		Nov. 19–Feb. 1	3	6	30
OON & OPOSSUM[5]		Oct. 17 (sunrise)–Feb. 29	No restriction on opossum; see *Regulations Digest*, P. 57, for raccoon		
AT[5]		Oct. 17–Feb. 29	No restriction		
		Nov. 19–Jan. 2 and Jan. 7–Jan. 28	Limited to certain counties, see *Regulations Digest*, P. 57		
ATORY WATERFOWL		Federal regulations may be obtained at www.ncwildlife.org or by calling toll free 1-800-675-0263 after Labor Day			
TE		No closed season or bag limits. Electronic calls allowed			
INDHOG		No closed season or bag limits			
RIA		No closed season or bag limits			
ER		See *Regulations Digest*, P. 58			
V		Wed., Fri., Sat. of each week from Aug. 3, 2011 through Feb. 29 and June 6, 2012 through July 28, 2012. See *Regulations Digest*, P. 59, for additional holiday hunts. No bag limits			
PED SKUNK		No closed season or bag limits			
ADILLO		No closed season or bag limits			

2011–2012 *North Carolina Inland Fishing, Hunting & Trapping Regulations Digest* for approximate boundaries of Eastern, Central, Northwestern and Western deer sons. For a copy of the *Regulations Digest*, write: N.C. Wildlife Resources Commission, 1722 Mail Service Center, Raleigh, NC 27699-1722 or visit www.ncwildlife.org.
Regulations Digest P. 55 for buck bag limits.
Cherokee, Clay, Graham, Jackson, Macon and Swain counties.
ludes blue-winged, green-winged and cinnamon teal.
bobcat, raccoon and opossum seasons are closed in the Harmon Den and Sherwood bear sanctuaries in Haywood County.

RALPH BENSLEY

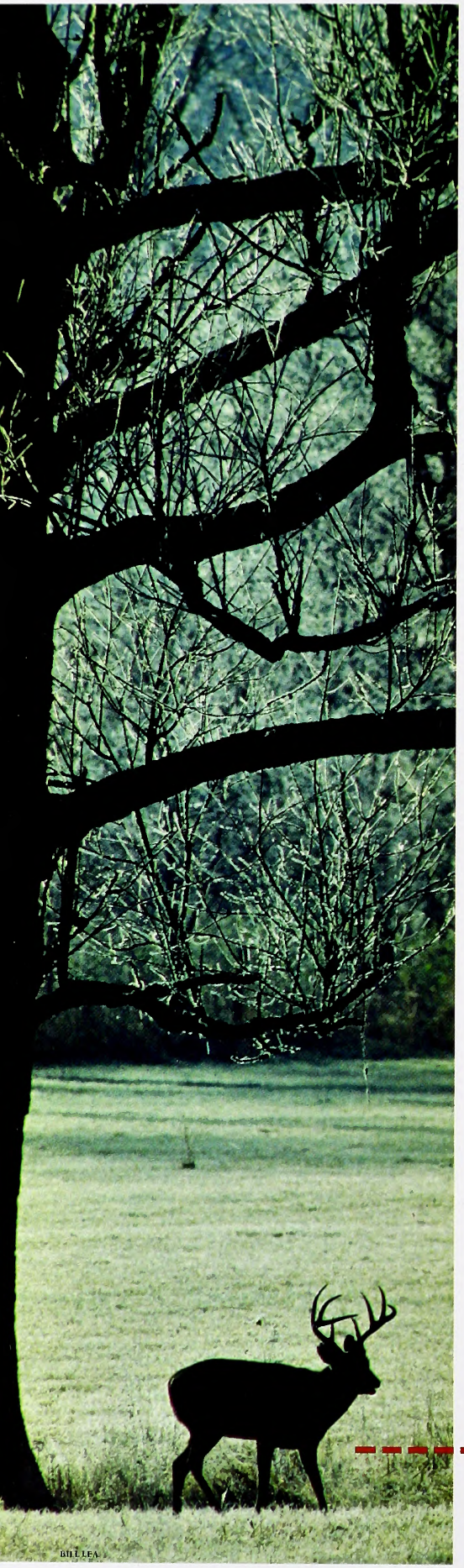
COOPERATING FOR BIGGER BUCKS

WRITTEN BY MARTY SHAFFNER

what if you don't have 1,000 acres to manage as you please,

WORKING WITH OTHER HUNTERS CAN HELP IMPROVE THE QUALITY OF LOCAL WHITETAILS.

It had been an uneventful morning on opening day of the 2009 gun season, until around 8 a.m. I saw movement on the far ridge line. A deer was moving with the steady walk of a rutting buck on the prowl. My binoculars confirmed what I first thought: It was a buck, but because of his steady pace and the thick trees, I couldn't tell how big his rack was or his age. I followed him in the binoculars until he paused in a small opening, where I got a good side view of his rack and was able to tell he had really good G2 tines, but I still couldn't determine his age or the true size of his rack.



I passed on the shot, one most North Carolina deer hunters would have taken. I passed because the year before I had made a hasty choice to take a buck that gave me a quick look from behind, only to find he was a 2½-year-old, 14-inch-wide 8-pointer. He was precisely the kind of deer we are trying to leave on the property. A deer that in another year or two would probably score around 120 Boone and Crockett points, a very respectable deer almost anywhere, but especially in North Carolina. Being it was my first year hunting on the property, the guys I hunt with let me chalk it up as a newbie mistake, but I was determined not to let it happen again. A few seconds later the buck melted into a sea of mountain laurel, and the only deer I saw all morning was gone.

I was full of expectations when I returned to the same stand that afternoon, but several hours later, as the sun sank below the ridgeline of the Eastern Continental Divide, I had yet to see a deer. Even though I had 30 minutes of legal shooting light left, the high hopes I had earlier were pretty much gone. I sat pondering my lack of deer sightings and wondering why, when out of the corner of my left eye I caught movement. I turned my head to see a deer working around the ridge with its head down, sniffing the ground, and saw two tines sticking out from behind a tree. I figured it to be a smaller buck, but as it emerged from behind the tree, I could tell it was my lost buck from the morning hunt.

I shouldered my rifle and found the buck in my scope. As he worked his way along the trail, which had several rubs and scrapes on it, I followed him in the scope, trying to determine his age, but couldn't quite make up my mind whether he was 3½ or 4½ years old, though his rack looked even better up close than it had earlier. The buck made his way behind a fallen oak tree top where a scrape was located. In the scope I could see him sniffing the scrape, and then the buck raised his head to mouth the licking branch, and immediately all doubt evaporated. He w shooter. The only problem now was I ha shot. The buck's vitals were obscured b thick brush of the treetop. A few intens onds later the buck turned to leave and re his search for does, no doubt. As he eme from the brush, the crosshairs settled o big buck's shoulder, and I quickly squee the trigger.

The shot from the .270 shattered th silence of the late-evening woods. The deer disappeared behind some small w pines but was stumbling as he went ou sight. I gathered my gear and lowered it by rope. When I got to the spot where buck was last seen, the trail was easy to low and quickly lead to the deer. As I wa up to him, grasped his antlers and lifted to see if my assumptions about his rack true, I saw they were. In fact, the more I ied the rack, the bigger it looked. (I later j to my hunting buddies that it was the buck I ever shot that got bigger when I wa up to it.) The 8-pointer had an 18-inch i spread, long heavy beams and back tine 9½ inches and scored 126¾, by far the bi buck of my deer hunting career.

I got lucky, or did I? There was some in being in the right place at the right t but the fact that a buck of that quality wa the property wasn't luck but planning. too many years ago this area was known lots of deer but few big bucks. So what h pened to turn the area around? More t anything, it was just a change in attitud

For many years hunters here harves every buck they saw, regardless of age or size. Then the four deer hunting clubs leased the land started passing on smal racked young bucks and in just a few ye started tagging bigger bucks. These four created a large block of land where yo bucks were protected and allowed to ma I know what most readers are thinking: T nice, but the land I hunt is only 75 acres 40 acres or even 20 acres, so this won't

There was some luck in being in the right place at the right time,

BUT THE FACT THAT A BUCK OF THAT QUALITY WA ON THE PROPERTY WASN'T LUCK BUT PLANNING.

GAW / NCWRC

MELISSA McGAW / NCWRC

e. But it can if you and other hunters ndowners around you form a kind of . When people who hunted the smaller of land around these hunt clubs saw the s that were being harvested and were ted about what the clubs were doing, ea caught on. The hunters who owned ed smaller tracks of land started passing ung bucks also, and the next thing they , almost the whole community had a nt mindset. In just a few years, bigger s began being harvested.

u hear a lot of talk about deer herds ng better genetics, but age is where it rts, especially in the South. Most deer gists now say that it is almost impos- to regulate the genetics of a wild deer Not too long ago biologists thought that rger, more mature bucks did the lion's of the breeding, but genetic testing on deer herds show almost all bucks con- e to reproduction. So what you have is shot of the genetics possessed by almost buck in the herd.

at being said, you don't want to elim- he genetics for large antlers. Some hunt- ubs or properties and even some states tler restrictions to regulate the harvest cks and have regulations restricting the st of bucks to 8 points or larger. In y this sounds good, but it is flawed in . What happens under these regulations t a large portion of bucks harvested are ar-old 8-, 9- or 10-pointers, which are cks with the best genetics. Under these tions a 2½-year-old buck can be har- l but a 5½-year-old 6- or 7-pointer can't be, even though he carries less desirable genetics than the younger buck. Those who use antler point restrictions to regulate buck harvest mean well but end up hurting the trophy potential of the whitetail herd.

If you are interested in harvesting trophy deer, 2½-year-old bucks that sport 8- to 10-point racks are the bucks that should not be taken. In two or three more years those bucks, in all probability, will be true trophy bucks. Antler characteristics are genetic, and certain antler traits can be seen on different properties. On the property I hunt, most bucks have a low, wide look to them, with average-length tines, but some bucks have an entirely different look. A small handful of bucks carry a genetic trait in which they grow an 8-point rack with long G2 points and short (in relation to the G2s) G3s that, combined with the antler tips, have a crab-claw look to them. These are impressive-looking bucks, although the shorter G3s hurt their score some.

Another point to note is that a buck carrying a spike rack shouldn't get an automatic death sentence. Almost all spikes are younger bucks, and if they don't grow into bigger bucks, you can always cull them out when they get older—and at least at that point you will have a nicer set of antlers rather than a spike. Usually a white-tailed deer in North Carolina has to reach at least 3½ years of age to score 120 Boone and Crockett points (and the average North Carolina buck will need to reach 4½ or 5½ years of age). Harvesting bucks by age is the key, because age will take care of genetics better than anything else, including antler point restrictions.

RALPH HENSLEY

In order to have bigger bucks, hunters must accustom themselves to passing on shots at younger bucks with large antlers.

RALPH

MELISSA McGAW / NCWRC

A lot of readers are probably wondering how they can age a buck in the field. The easiest and simplest way to age a buck while hunting is to look at the body. A 1½- to 2½-year-old buck's rear half will be larger than his shoulders. A 3½-year-old's front and rear sections will be equal in size. After a buck reaches 4½ years old, his front end starts getting bigger than his rear end. His shoulders and neck will be very muscled and thick. His whole body will be thick, even down his back and into his hams. This quick and easy formula will serve you pretty well for aging bucks in the field.

The buck-to-doe ratio and overall deer population are important parts to managing a deer herd for trophy bucks also. The buck-to-doe ratio in a lot of areas in North Carolina is skewed toward more does than bucks, which is a product of harvesting too many bucks. On the property I hunt the ratio is pretty good, but it isn't one-to-one, which is ideal for trophy management. Whitetail fawn birthrate is pretty much one buck to one doe, which should show that is ideal. We do harvest some does every year, and fawn predation mainly from coyotes, and a little from bobcats, helps to keep our deer population in check.

Does, just like bucks, should be harvested by age, taking the older does and leaving the younger ones. Aging a doe is a little different than aging a buck. I find that two chara istics help me age a doe best. One is t overall body size, but this can sometim deceiving. I have seen 6-year-old does w body sizes were smaller than some 3-yea does. The one body characteristic that se to hold true is that as a doe ages, she ha increased head size. A head that looks pr tionately large, with a big Roman nose dead giveaway of a mature doe. Around l we call them "old mule-headed does" bec from the side they do favor a mule.

You have to harvest some does, beca section of land can sustain only so many and having too large a population stresse herd. Unhealthy bucks won't reach th potential antler growth, and malnourish does will be too stressed to produce enc milk for their fawns to have the optim growth rate. Harvesting does instead of y bucks is an important part of the manage plan. Harvesting only bucks will never r keep the population in check. A handfu bucks will breed numerous does becaus does generally will come into estrus ev 28 days until bred. What happens is n fawns are born, then more yearling buck harvested, and the buck-to-doe ratio bec more skewed.

The great part about this managem plan is that no matter how much money

o invest in deer hunting, this scheme elp you kill bigger bucks. Certainly, hing you can do to improve habitat will our hunting. A lot of hunters, however, ave enough spare cash or the equip- eeded to plant food plots, which se not only the antler size of bucks but l herd health as well. But even without lots, harvesting bucks by age will help t a shot at a bigger buck.

I pointed out earlier, age naturally about larger antlers, so even without lots or supplemental feeding, after a ars bucks with increased antler size l be harvested. I know most hunters nking that is alright if you own or lease acres, but that it won't work on 20 acres. at to the guy not too far from where I ho last year killed, with his bow, on his e tract, a buck that scored 154 nontyp- ints. That land has been under trophy gement for several years, along with the bors' adjoining tracts. These hunters one-buck-a-year limit, period. If you up and shoot a small buck, there is no er. You get to sit in your stand and har- oes while everybody else is hunting for uck of a lifetime.

ain, what hunters on small parcels of ave to do is form co-ops. If you get er hunters on 10 parcels of land con- of 25 to 100 acres each, you then have 1,000 acres under trophy manage- Start the program and stick with it. by never harvesting a buck smaller he biggest buck you have ever taken. ave to get over the *If I don't kill that little somebody else will* mentality. Some will led, but some will survive to grow into bucks. Eventually, if everything goes you will have to take a buck smaller our biggest if you want to take a buck year.

I'm not going to lie to you, that first 8-pointer you let walk is a slightly traumatic experience. After he walks away, you think, *What have I done? I'll never see him again.* But if you do see him again, it's a better feeling than if you had harvested him earlier. Also nothing helps you stay put in a deer stand like seeing bucks. If you just have to pull the trigger, instead of taking young bucks, harvest a few does. That will help your deer herd in the long run. Wouldn't you rather wrap your hands around the antlers of a buck that is by far bigger than anything you've ever taken? When you do, you'll be glad somebody let him walk when he was young. ◆

Marty Shaffner is a writer and fishing guide who lives in Elkin. He is a frequent contributor to Wildlife in North Carolina.

Habitat improvement and harvesting some does also are key components in having bigger bucks.

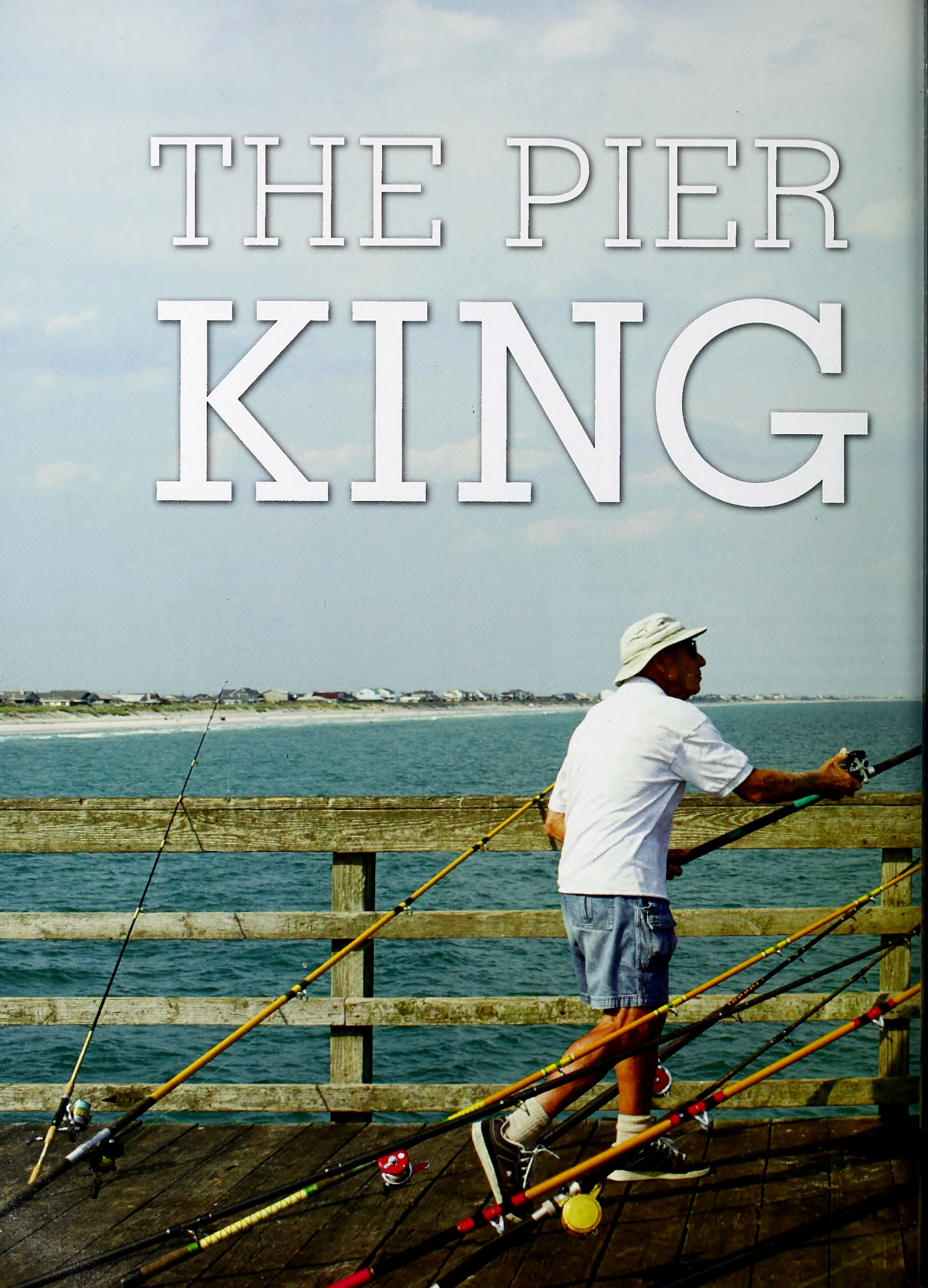
BILL LEA

MELISSA McGAW / NCWRC

HAVE TO HARVEST SOME DOES,

because a section of land can sustain only so many deer, and having too large a population stresses the herd.

THE PIER KING

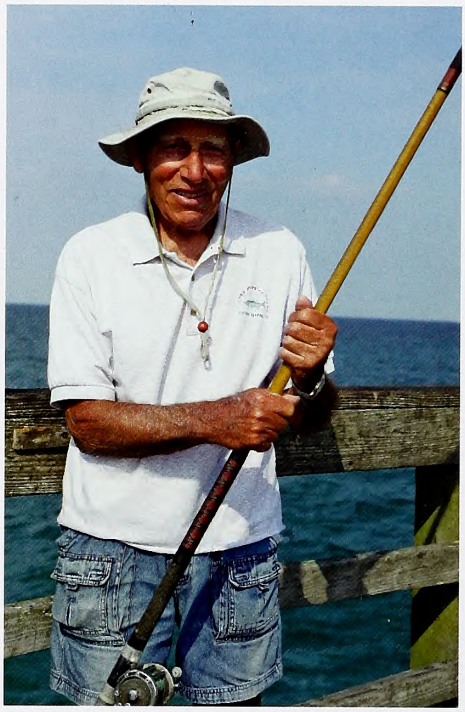


For 56 YEARS, **ANGELO DE PAOLA** has found pleasure in CATCHING **KING MACKEREL**—and lots of them—from the **JOLLY ROGER PIER**.

written by **JACK HORAN** photographed by **MELISSA McGAW**

Anglers who return each spring to fish from the Jolly Roger Pier at Topsail Beach stop in the pier house, buy their fishing permit, load up on bait and then invariably ask pier employees if "Deep" is still around and fishing. The answer is always yes.

At the Jolly Roger, most of the regulars know who Deep is. And they know where to look for him. Mornings and afternoons, on most any day between May and October, he can be found at the end of the pier, wearing a floppy hat and cutoff shorts on warm days, his wiry frame hunched over a weathered gray rail, lines from two rods in the water and an ear cocked to pick up the clicking of his reel over the rolling thunder of the surf and squawk of seagulls.



Deep is Angelo De Paola, a longtime fixture at the pier 20 air miles north of Wilmington. De Paola is a fisherman's fisherman. He has attained near-legend status for his persistence and prowess catching king mackerel as well as othe large fish, from amberjack to tarpon. I decades of fishing at the Jolly Roger, he landed an astounding 512 king macke and more than 800 other game fish, plu to 40 sharks and even a sailfish. That do include the countless bluefish, spotted trout and Spanish mackerel lifted from frothy waves into the frying pan or, in n recent years, released alive. And he's st an active angler.

But De Paola holds another remarka achievement — one of longevity. He's b walking the planks of the Jolly Roger ste for 56 years. He started fishing on what then called the New Topsail Ocean Pier 1955, the year after it was built. For tho too young to remember, Eisenhower w president then, Alaska and Hawaii were U.S. territories, "Rock Around the Cloc by Bill Haley and the Comets was a No song and "The $64,000 Question" was top TV show.

Deep turned 90 last November. He h the strength, endurance and mental acu of a man 30 years his junior. Like other anglers, he tows a pier cart bristling wi rods and reels and crammed with rigs a lures to the end of the 850-foot-long p He catches his own baitfish for his kin mackerel rig and puts the baitfish to wo in the heavy swells seaward of the pier. exudes a passion for fishing that's contag "I guess I continue to fish because it's s thing I love to do," said De Paola. "It's t fresh air, the thrill of having a big fish o

Decades ago, he would sometimes na a sleeping bag while spending the night the pier. In recent years, he's trimmed b his pier time by half or more from the p vious 180 days a year, and he no longer fi dawn to dusk. "It's hard for me to stand on that pier all day long — I guess age h caught up with me," he noted wryly.

Robby Jordan, a Jolly Roger employ has fished with De Paola since 1972. "T is his second job. He fishes," Jordan sa of his friend. "I tell him it's time to go work when he comes through. This is joy. He enjoys being on the end of that p fishing. He's dedicated to fishing. That's he wants to do.

:k in the old days, it was daylight
:, I don't care how cold it was or
ndy it was, we'd stay and fish. And
a lot of fish too."

Paola didn't grow up, as one might
t, in the shadow of a fishing pier. He
rn in Italy about 35 miles north of
in 1920. His father had immigrated
:rica for a better life. Angelo and
ther couldn't join him for years.
r saw my father until I was 8 years
e said.

:e in America, the De Paola (pro-
ed dee-pay-ola) family settled in
n, N.J., in the New York metropoli-
a. As a boy, Angelo would break off a
ie a line with a hook on it and fish for
in local streams. In 1940, he joined
rine Corps, was assigned to Camp
ie and met his wife, Janie, who grew
New Bern. He saw combat in World
and came back to Camp Lejeune
ie war. It was in the Marines where he
up his nickname, DP, which turned
eep or Deepy. After his enlistment
, he got a job as a civilian firefighter
base.

his days off, living in Jacksonville,
la would fish in the surf on nearby
l Island. In 1954, the late Lewis Orr
t the New Topsail Ocean Pier. It didn't
long; Hurricane Hazel blew it down
nths later. Orr rebuilt the pier and
ed it in 1955. In that year De Paola
ed from surf to pier fishing because
nd it more productive to catch fish
he elevated platform that extended
e ocean.

De Paola said back then fish were superabundant by today's standards, as numerous as whitecaps in a nor'easter. "There was just more fish," he said. "Anytime I went fishing, I caught fish." He remembers seeing huge schools of mullet moving along the shoreline. "You could look up and down the beach; all you could see was black. Nothing but fish. Continuing fish for miles."

In 1975 he ended his career at Camp Lejeune, retiring as fire chief. He relishes recounting the conversation he had with a colleague about his plans for retirement.

"What are you going to do?"

"Go fishing."

"You can't fish every day."

"You watch me."

Fish he did, and four years later the De Paolas moved from Jacksonville to Topsail Beach, to a house that's two blocks from the Jolly Roger.

It was 18 years earlier that the king mackerel bug bit De Paola. In 1957 after a charter boat captain told De Paola that he saw kings jumping close to shore. King mackerel are streamlined, toothy wanderers, migrating to the North Carolina coast in spring as the water warms above 68 degrees and often hanging around piers. They feed mainly on menhaden and sardine-like fish. In 2010 recreational anglers in North Carolina caught 35,947 kings averaging about 10 pounds each, according to the Division of Marine Fisheries. The daily limit is three, and minimum length is 24 inches.

The tip that king mackerel could be caught from piers began De Paola's career as North Carolina's premier pier king fisherman. At the Jolly Roger, as well as other ocean piers, anglers station themselves at the T end of the pier. This is De Paola's workplace, an open-air office where the pilings tremble with each passing wave and the view takes in the sparkling Atlantic, fishing boats and passing dolphins.

De Paola uses two fiberglass rods, an "anchor" rod and a "fighting" or "landing" rod. The line on the 10½-foot-long anchor rod is tied to an 8-ounce sand anchor. When thrown 200 to 300 feet, the tines of the anchor dig into the bottom, holding the line in place. Next, he hooks a live baitfish, usually a bluefish, with two treble hooks fastened to a wire leader on a 30-pound test line on the landing rod, also 10½ feet long. A wooden clothespin clips the two lines together, forming what is known as a trolley rig. He lowers the baitfish into the water so

Like many pier anglers, De Paola hauls his fishing cart (opposite) with him each day. Through the years, "Deep" has recorded an impressive variety of fish off the Jolly Roger, including a tarpon (above).

swim freely along the lines, looking
meal fit for a king. When a king mack-
rabs the baitfish and starts to run, the
ng rod's line pops free from the clothes-
Fish hits. It disconnects. It's real
e," De Paola said.
ith their rods leaning against the rail,
anglers gather together, talking about
g, the weather, baseball or glory days
seball. All they need to do is listen for
uzz-saw-like clicking of their reels,
n signals a fish is on. They may wait
s, even months for a strike. Boring? Not
De Paola said. "We're always anticipat-
at something's going to happen. You're
s thinking you probably will have a
, should have a strike," he said. Some
ut a bottom rig to catch sea mullet,
or spot to help fill the freezer and
the time away.
1980 the king of the king anglers
nt four in one hour. In 2007 De Paola
ed a personal milestone by catching
00th king. That year, the North Carolina
ng Pier Society presented him with
-fishing lifetime achievement award.
ird of Fort Mill, S.C., president of the
ty, said it's extremely unlikely anyone
g from a North Carolina pier will ever
ach De Paola's current lifetime total of
ings. Unlike boat fishermen, who can
out king mackerel in multiple locations,
ishermen must wait for kings to swim
eir outpost. Baird said for someone to
500-plus kings from a pier today would
difficult to accomplish as it would be
major league pitcher to surpass the
itching wins of baseball's hall of famer
ung. "This is like Cy Young's victories,
Baird said. "No one will ever come
." (The most wins by an active pitcher
7, as of June 2011.)
e Paola keeps detailed records of the
mackerel he has landed. He said the
ber of catches peaked three decades
nd has declined since. In 2010, Jolly
r anglers landed 30 kings, including 11
ne day in mid-October. "That day we
ht 11, we probably had 20-odd strikes.
in the '70s, we always caught 300 a
on the pier," he said.

ola not only catches fish, he dispenses advice and helps novice anglers figure out itricacies of fishing for king mackerel. As of this past June, De Paola had landed pressive 512 kings from the pier.

NATURE'S WAYS

Why Do King Mackerel Have Such Sharp Teeth?

See Nature's Ways, page 43.

Of the 30, Deep got five kings. The first came in July, a 13-pounder. He landed the other four during an October king blitz. He got a 26½-pounder on Oct 11, a 17½-pounder and a 20-pounder on Oct 15, and a 24-pounder on Oct 18. His biggest ever weighed 39 pounds.

Kings aren't the only fish that have made De Paola's reel whine. He's caught amberjack, cobia, red drum, a 110-pound tarpon and a 400-pound lemon shark. A night-cruising tiger shark was De Paola's ultimate heavyweight. He latched onto the 11-foot-long shark in 1962 long after most people were asleep. "We fought it all night long. The darn thing was tremendous," he said, forming a circle with his arms nearly the circumference of a tire. "I hooked it about midnight. It was four o'clock in the morning when we got him to the beach. We knew we had a shark, but we didn't know how big it was. We were sure it was over 500 pounds."

The pier had no scales to weigh the Tar Heel Jaws. The monster could have mashed the scales at 1,000 pounds or more. That's because De Paola's shark was just 2 feet shorter than the world record tiger shark, caught two years later off the Cherry Grove Pier in South Carolina. That record shark weighed 1,780 pounds.

His most extraordinary catch came in 1978 when he hooked a sailfish, typically found in the Gulf Stream. De Paola had never seen one before. "I heard the reel take off and saw this sailfish in the air," he related. "He came out of the water and spun in the air. He kept making great leaps." What was a sailfish doing along Topsail Island? De Paola said the same week three were caught a mile off Wrightsville Beach. "Maybe the fish had come in on a warm finger of the Gulf Stream," he theorized. The 7-foot-long, 40-pound, blue-and-green fish hangs from a wall in De Paola's house.

De Paola likes to share his time-tested expertise with others. Friends point to his selflessness in helping novice anglers. "He's always been a part of things here," pier manager Robin Orr said. "A really nice guy. And catches big fish — and plenty of them. He's been a good influence on a lot of people, taking countless kids under his wing to give them tips and such."

Mark Willis of Beulaville took up king mackerel fishing in 2009 under De Paola's tutelage. Though he hasn't caught a king yet, he did land a highly sought-after prize, a tarpon, hot-weather visitors to the coast "Angelo was the first one to help me get my tarpon up here. I've learned a lot out here from him. He's a good guy. It's amazing that he's doing this [at his age]," he said last year.

De Paola's knowledge of fishing and his physical stamina have made him a local legend. Orr related this story that is pure Deep. Several years ago, Orr said, he was talking with a new town police officer when a pier angler hooked a tarpon, walked the fish down the pier to the beach, hopped off the pier and worked the fish in the surf. Sprinting behind the angler was an older man, gaff in hand.

"Who's that guy, what's he doing? And how old is he?" asked the astonished officer as the older man ran behind the angler fighting the tarpon. "Well, that's Angelo," Orr replied, explaining that he was about to gaff the tarpon and pull it onto the sand, "and he's in his mid-80s."

As he approaches 91 in November, De Paola remains an integral part of the Jolly Roger Pier community. He's a widower now; Janie, his wife of 68 years, died in January (the couple had three children, six grandchildren and three great-grandchildren). He still savors the excitement of a strike of a king mackerel, however occasional, and the satisfaction of fighting and landing the fish. "Every day I'm out there, That's what I'm working for," he said. "I just enjoy being out, hearing the reel scream off." ◆

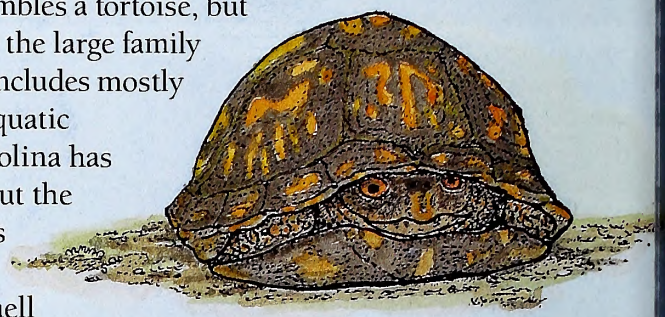
Jack Horan of Charlotte is retired outdoors editor of the Charlotte Observer.

Few reptiles are as popular or well known as our state reptile. Meet the

Turtle in a Box

written by Jeff Beane / illustrations and nature activity by Anne M. Runyon

The Eastern box turtle is North Carolina's only fully terrestrial turtle. It resembles a tortoise, but actually belongs to the large family Emydidae, which includes mostly aquatic and semiaquatic species. North Carolina has no true tortoises, but the box turtle occupies a tortoise's niche. Its thick, domed shell and heavy limbs are adaptations to life on land.



HOME IN A BOX

The box turtle's common name refers to its ability to close its shell. All turtles can withdraw at least partially into their shells, but in most species the bottom part of the shell, called the plastron, is immovable. A box turtle's plastron is hinged, and can completely enclose its head and limbs. Mud and musk turtles also have hinged plastra, but theirs are smaller, offering less protection. Aquatic turtles trade some protection for mobility in water.

The box turtle's scientific name, *Terrapene carolina*, means "Carolina terrapin." Terrapin is derived from a Native American word for turtle. Although box turtles are sometimes called "dry land terrapins," biologists normally use that name only in reference to the diamondback terrapin, which lives in our coastal salt marshes.

ISIDE THE BOX

ox turtles occur in all North Carolina counties, in a wide variety habitats, but they prefer moist woodlands. Their varied diet cludes insects, worms, slugs and snails, small vertebrates, car-on, fungi (including some mushrooms very toxic to humans) and wide variety of plant material—especially berries and other fruits. Male box turtles grow slightly larger than females. Males tend to more colorful, and usually have longer, thicker tails, a concave area the lower plastron, thicker, more curved claws on their hind feet, nd bright red eyes. A female usually has a flat, proportionally nger plastron, deeper shell, and brown, yellowish or dark red eyes. Box turtles may mate opportunistically throughout the warmer onths. In spring or early summer, a female uses her hind feet to g a vase-shaped nest, into which she deposits from two to seven sually three or four) oval, leathery-shelled eggs. A female may nest ore than once during a season. Eggs hatch in two to three months. me hatchlings emerge in late summer or fall; others remain in e nest until the following spring. The tiny juveniles are secretive nd seldom encountered. Their plastral hinges do not develop until ey are 2 or 3 years old; hence hatchling box turtles are often mis-ken for other species. Box turtles mature in about seven to 10 years, nd can live for 50 years, or occasionally much longer.

Box turtles overwinter in soft soil beneath surface litter, but they ay occasionally be active on warm winter days. Radiotelemetry udies have taught us much about their home ranges and move-ent patterns. Most individuals have well established territories, nging from less than an acre to well over a hundred acres, depend-g on habitat and available resources.

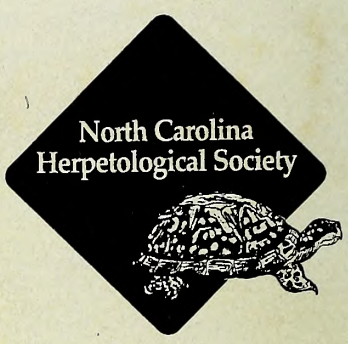
For more information on how you can help box turtles, visit the Box Turtle Collaborative website: sites.google.com/a/uncg.edu/ncboxturtles.

OUTSIDE THE BOX

Turtles have long symbolized perseverance, longevity, continuity and strength. Box turtles are no exception. Four of the 26 states to have thus far adopted state reptiles have selected box turtles. North Carolina adopted the Eastern box turtle as its official state reptile in 1979.

Ancient and highly adaptable, box turtles were once extremely abundant. Human activities have greatly reduced their populations through habitat loss and fragmentation. Turtles walked with dinosaurs, but roads, automobiles, bulldozers, lawnmowers, subdivisions, shopping centers and introduced predators present much greater challenges. The N.C. Wildlife Resources Commission includes the box turtle as a priority species in its Wildlife Action Plan. One goal of the plan is keeping common species common. The box turtle is considered an "umbrella species"—protecting its habitat will result in the protection of many other species.

Tennessee picked the Eastern box turtle as its state reptile, while Missouri claimed the three-toed box turtle (a separate subspecies, *T. c. triunguis*). Kansas chose our other North American species, the ornate box turtle (*T. ornata*). Box turtles are also popular in various logos, including that of the North Carolina Herpetological Society.



Get Outside

Regardless of where you live in North Carolina, you should be able to find box turtles nearby. Unless you are in a highly urbanized area, or on certain portions of the Outer Banks, you may have them in your neighborhood. They aren't always easy to find, but woodland paths, gardens, berry patches and along brush piles are good places to look. Sometimes placing fruit scraps along the edge of a woodlot may attract them. One of the best ways to encounter box turtles is to slowly ride country backroads on warm days, especially after summer rains.

If you find turtles while you are out exploring your surroundings, it may be tempting to keep box turtles as pets, but besides the fact that they have special space and lighting requirements, a pet turtle is a lifetime commitment. They are best enjoyed in the wild, where they belong. Short-term captives should be released back exactly where they were found. Long-term captives should not be released anywhere. Never move box turtles far from where they were found; they have familiar home territories just as you do.

Turtle watching takes time and patience. Should you encounter a box turtle, rather than rushing to pick it up, try watching it from a distance. You may get to see feeding, mating, fighting, nesting or other activities. Never paint box turtles, or carve into their shells to identify them. Take photos instead; individuals can be identified by their unique markings. Make an album of the turtles in your neighborhood. Record where and when you find them, and their behavior. Consult an expert for other noninvasive methods of marking box turtles for study. If you find an injured box turtle, contact a wildlife rehabilitator or the North Carolina State University College of Veterinary Medicine's Turtle Rescue Team (919-982-5923; clubs.ncsu.edu/waazm/turtle_rescue_team.htm). Provide information on exactly where the turtle was found, so it can be returned when recovered.

Read and Find Out

- "Box Turtle at Long Pond" by William T. Gec Greenwillow Books, 1989.
- "North American Box Turtles: A Natural Hist by C. Kenneth Dodd, University of Oklaho Press, 2002.
- "Reptiles of North Carolina" by William N Palmer and Alvin L. Braswell, University North Carolina Press, 1995.
- "The Box Turtle Connection" by Ann Berry Somers and Catherine E. Matthews, 2006, available as a downloadable pdf: www.uncg. ~absomers/BoxTurtleBook.pdf.

In *Wildlife in North Carolina:*

- "Home is Where the Shell Is" by Jane Rohlin Aug. 1988.
- "The Perilous Good Life of the Box Turtle" b Jim Dean, Feb. 1999.
- "A Turtle Bears the Weight of the World" by Elizabeth Hunter, July 2001.
- "Is a Turtle Safe in its Shell?" by Jeff Beane, June 2005.

Find out more about Project WILD Worksho and literature at the Wildlife Commission's we site at www.ncwildlife.org.

The Wildlife Endowment Fund

An Investment for the Future

Established in 1981, the Wildlife Endowment Fund allows the Wildlife Resources Commission to accept tax-deductible contributions for wildlife conservation. Money from the sale of lifetime licenses is also placed in this fund. Your donation or purchase will ensure that North Carolina will have a rich wildlife heritage for generations to come.

Lifetime License Form

Infant and Youth *(check appropriate block)*:

☐ Sportsman Infant $200
(under 1 year old—Application must be received before applicant has attained 1 year of age.)

☐ Unified Sportsman/Coastal Recreational Fishing Infant $275
(under 1 year old—Application must be received before applicant has attained 1 year of age.)

☐ Sportsman Youth $350
(ages 1 through 11—Application must be received before applicant has attained 12 years of age.)

☐ Unified Sportsman/Coastal Recreational Fishing Youth $450
(ages 1 through 11—Application must be received before applicant has attained 12 years of age.)

A copy of the birth certificate must accompany applications for infant and youth licenses. Birth certificate documentation cannot be returned.

Note: Pending satisfactory completion of the hunter safety course, persons who possess infant or youth licenses may exercise the privileges thereof when accompanied by an adult who is properly licensed to hunt in North Carolina. "Accompanied" is defined as maintaining a proximity to the hunter which enables the adult to monitor the activities of, and communicate with, the hunter at all times.

Adult (age 12 or older) *(check appropriate block)*:

☐ Comprehensive Inland Fishing. $250
(N.C. residents only—includes basic inland fishing, trout & trout waters on game lands)

☐ Comprehensive Hunting. $250
(N.C. residents only—includes basic hunting, big game, game lands & N.C. waterfowl)

☐ Sportsman. $500
(N.C. residents only age 12 or older—includes basic hunting & inland fishing, big game, game lands, trout & N.C. waterfowl)

☐ Coastal Recreational Fishing $250
(N.C. residents only—includes coastal recreational fishing)

☐ Unified Sportsman/Coastal Recreational Fishing $675
(N.C. residents only—includes some privileges as the Sportsman, plus coastal recreational fishing)

A federal waterfowl stamp must be purchased separately for all N.C. hunting licenses.

Note: On or after July 1, 1991, a person, regardless of age, may not procure a hunting license or hunt in North Carolina without producing a certificate of competency for completing the hunter safety course or a hunting license effective prior to July 1, 1991, or by signing the statement below that he or she had such a license.

Check appropriate block and attach required copy:

☐ Copy of Prior Year Hunting License

☐ Copy of Hunter Safety Certificate of Competence

☐ In lieu of copy, I am signing the statement below:

Statement: I certify that I was a licensed hunter prior to July 1, 1991.

Signature _____ Date _____

Visit us online at www.ncwildlife.org or call 1-888-248-6834 for a complete list of lifetime licenses, including those for nonresidents and 65 and older.

Lifetime License

Complete the following information if applying for a lifetime license. Be sure to check appropriate block(s) on reverse side *(please print legibly)*:

Name of Applicant _____

Daytime Phone _____

Mailing Address _____

Residcnt Address _____

County _____ Date of Birth _____ Drivcr License # _____

E-mail Address _____

Is this license a gift? ☐ Yes ☐ No If yes, mail license to ☐ Donor or ☐ Applicant.

License Donor's Name *(if applicable)* _____

Donor's Telephone # _____

Donor's Mailing Address _____

City _____ State _____ Zip _____

Method of Payment: ☐ Check ☐ VISA ☐ MasterCard

Acct. # _____ Expires _____

Print name exactly as it appears on credit card _____

Cardholder's Signature _____ Date _____

Personalize your Lifetime License for an additional $5:
Indicate your selection of letters, numbers, dashes, periods, commas and /or blanks up to 6 spaces: ___ ___ ___ ___ ___ ___

Indicate your personal message including letters, numbers, dashes, periods, commas and /or blanks up to 21 spaces:

___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
___ ___ ___ ___ ___ ___ ___ ___ ___ ___

Signature of Applicant or Donor _____ Date _____

Note: Only adult lifetime licenses may be purchased by phone or online (VISA or MasterCard only). Call toll-free (1-888-248-6834) or visit us at www.ncwildlife.org. Use this form to purchase infant and youth lifetime licenses by mail.

Tax-Deductible Contribution

☐ I wish to make a tax-deductible contribution to the Wildlife Endowment Fund. Enclosed is my check for $ _____. *(Credit card payments cannot be accepted.)*

Name _____

Daytime Phone _____

Mailing Address _____

City _____ State _____ Zip _____

Make checks payable to: *Wildlife Endowment Fund*

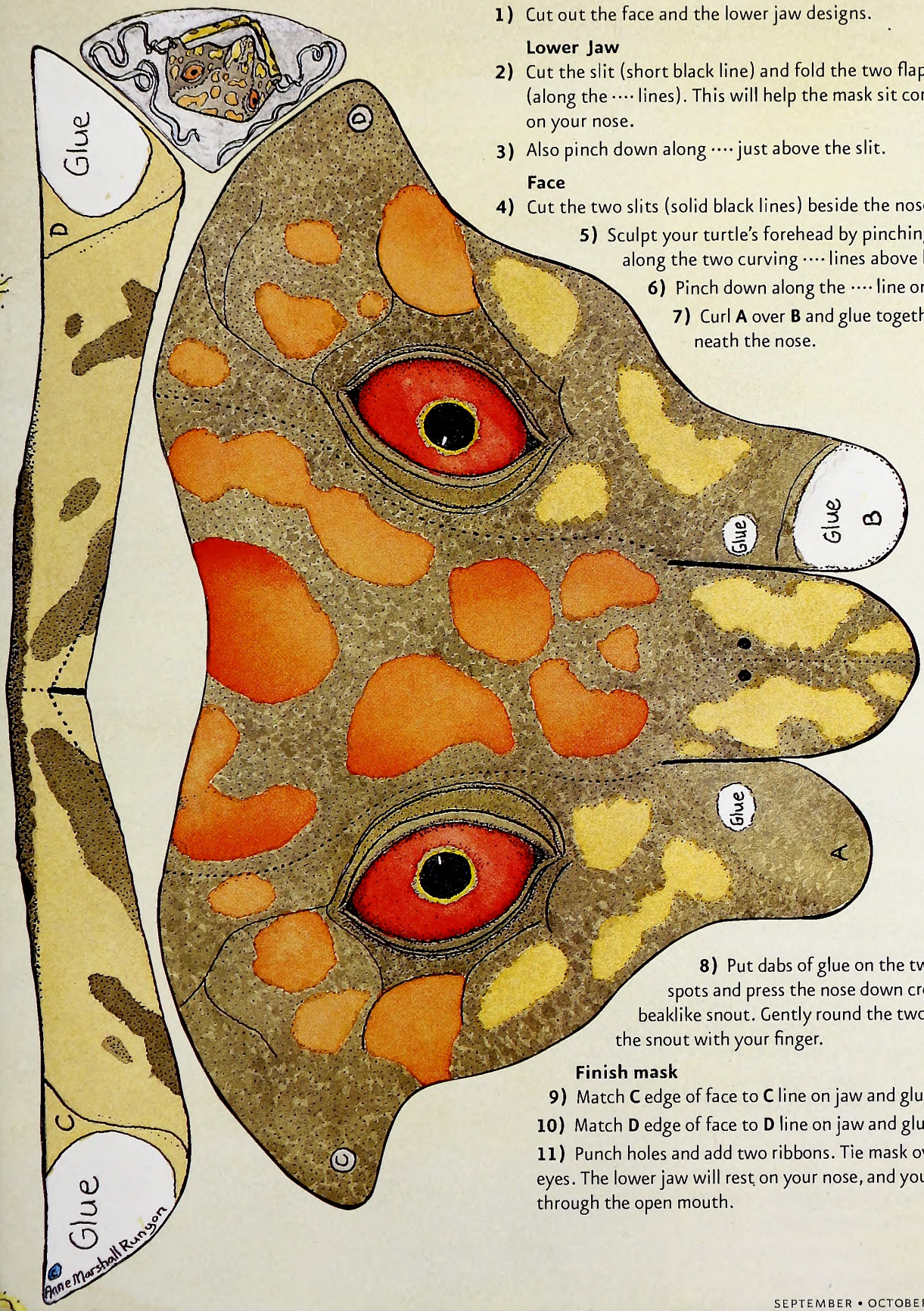
Transactions are not considered final until the check has cleared the bank. Items purchased with a returned check will be made invalid. A service charge of up to $25 will be charged on any returned check. (N.C.G.S. 25-3-506)

Mail completed application and payment to:
NCWRC, License Section, 1707 Mail Service Center, Raleigh, NC 27699-1707

Office location: *NCSU Centennial Campus, 1751 Varsity Drive, Raleigh, N.C. 27606*
Telephone: 1-888-248-6834 (2HUNTFISH)

Make a Box Turtle Mask

(based on an adult male Eastern Box Turtle)



1) Cut out the face and the lower jaw designs.

Lower Jaw

2) Cut the slit (short black line) and fold the two flaps down (along the ···· lines). This will help the mask sit comfortably on your nose.

3) Also pinch down along ···· just above the slit.

Face

4) Cut the two slits (solid black lines) beside the nose.

5) Sculpt your turtle's forehead by pinching down along the two curving ···· lines above his eyes.

6) Pinch down along the ···· line on his nose.

7) Curl **A** over **B** and glue together, underneath the nose.

8) Put dabs of glue on the two glue spots and press the nose down creating a beaklike snout. Gently round the two corners of the snout with your finger.

Finish mask

9) Match **C** edge of face to **C** line on jaw and glue together.

10) Match **D** edge of face to **D** line on jaw and glue together.

11) Punch holes and add two ribbons. Tie mask over your eyes. The lower jaw will rest on your nose, and you can see through the open mouth.

Commission, N.C. Aquarium Work to Restore Gopher Fro

The N.C. Wildlife Resources Commission is partnering with the North Carolina Aquarium at Fort Fisher to raise gopher frogs from one of the few remaining wild populations.

Gopher frogs, once common across the lower Coastal Plain and Sandhills have declined dramatically with the loss of longleaf pine forests. Gopher frogs require fire-maintained pine forests to provide the stump holes and grassy vegetation that are utilized as summer habitat. Additionally, these forests need to contain isolated temporary wetlands, sometimes referred to as vernal ponds, to provide the winter breeding habitat required by gopher frogs.

Today only a handful of gopher frog populations persist on the larger publicly managed lands in North Carolina.

One of the most critically threatened populations occurs on Holly Shelter Game Land in Pender County. The historic ponds used by breeding gopher frogs have been lost to development, leaving the frogs with only one small man-made pond in which to breed.

Commission staff have recently initiated an effort to enhance the pond, attempting to make it function more as a natural wetland and provide better habitat for gopher frog tadpoles. Because the site has failed to produce juvenile gopher frogs in recent years, commission biologists collected a small portion of the gopher frog egg masses that were deposited there this winter. The eggs were transported to the Fort Fisher aquarium where they were hatched. Currently, several hundred tadpoles are being raised into small frogs before being released back onto Holly Shelter Game Land.

"We wanted to guarantee that we got some level of successful reproduction into the population this year," said Jeff Humphries, a biologist with the commission. "The aquarium possessed the necessary resources to pull off an effort of this type, so they were a natural fit for us."

JEFF HA

Commission biologists hope to finish final modifications to the breeding site this summer, thereby providing more suitable breeding habitat for upcoming winter.

Funding for the commission's gopher frog research and management comes from the Nongame and Endangered Wildlife Fund, which supports wildlife research, conservation and management for animals that are not hunted and fished. Although tax check-off donations target projects benefiting nongame animals and their habitats, game species such as deer, turkey and bear also benefit because they share many of these same habitats.

North Carolinians can support this effort, as well as other nongame species research and management projects in North Carolina, by:

Donating through the Tax Check-off for Nongame and Endangered Wildlife on thei State Income tax form;

Registering a vehicle or trailer with a N.C. Wildlife Conservation license plate.

Donating online at ncwildlife.org/give.

In addition, the gopher frog will b tured on the commission's 2011 N.C. Fair button. Pick up yours at the commi exhibit during the Mountain State Fair, to 18, or the State Fair in Raleigh, Oct. 23. The commission's fair exhibit, wil ture exhibits on the theme "W Science for a Better Futu

PICK UP YOUR GOPHE BUTTON AT OUR EXH AT THE N.C. STATE FA

e NEWSLETTER
Get N.C. Wildlife Update—news including season dates, bag limits, legislative updates and more—delivered to your Inbox from the N.C. Wildlife Resources Commission. Sign up at www.ncwildlife.org/enews.

Young Anglers Win Lifetime Licenses

eigh angler George Sinor didn't catch any fish at the Lake Wheeler Park kids' fishing vent on June 4, but he did reel in a lifetime sportsman license, courtesy of Neuse Sport n Kinston.

orge, 9, was one of two young anglers to take home lifetime licenses as part of a state-lrawing for participants in kids' "Fish for Fun events," held in May and June in cel-on of National Fishing and Boating Week 2011. He won the grand prize, a unified lifetime sportsman/coastal recreational fishing license, valued at $450 and donated use Sport Shop of Kinston.

orge, along with his parents Scott and Diana, attended the N.C. Wildlife Resources nission's business meeting on July 7, where Steve Windham, commission chairman, ited him with his lifetime license and certificate.

orge's lifetime sportsman's license will let him fish and hunt in North Carolina for r life—even if he moves out of state. These fishing and hunting privileges include g in all public waters—from the mountains to the coast—as well as hunting for big hunting on game lands and waterfowl hunting.

ah Stephenson, 5, from High Point, won the first prize, a lifetime freshwater fishing e, valued at $250, and donated by the N.C. State Council of Trout Unlimited. Noah's e gives him fishing privileges in all public inland waters in North Carolina, including nated mountain trout waters, trout waters on game lands and joint waters. He partic-in the kids' fishing event at Oak Hollow Lake in Greensboro on June 4.

e N.C. Wildlife Resources Commission, along with the U.S. Forest Service and Bass nops, supported these free fishing events during National Fishing and Boating Week mote fishing as a fun, outdoor activity the whole family can enjoy.

each event, registered participants were entered into a drawing for fishing-related s. Bass Pro Shops and the Wildlife Resources Commission donated rods and reels, boxes filled with tackle, fish playing cards and spools of fishing line. A list of winners ted on the N.C. Wildlife Resources Commission's website, ncwildlife.org.

Ve would like to thank everyone who made these fishing events such a great success ear," said Kyle Briggs, a program manager for the commission's Division of Inland ries. "The Wildlife Commission has supported these events over the last 10 years to trage families to spend time together enjoying the outdoors and learning the basics aing.

Generous donations by Neuse Sport Shop, Trout Unlimited and Bass Pro Shops, with the assistance of the U.S. Forest Service and local sponsors, have made these s possible."

r more information on fishing in public, inland waters, visit ncwildlife.org/fishing.

MELISSA McGAW/NCWRC

to right) Ben Coats with Raleigh Parks and Recreation, Russell Rhodes of Neuse River Sports , license winner George Sinor, Steve Windham and Ned Jones of N.C. Trout Unlimited.

IN SEASON

Black Bear: See *Regulations Digest* for seasons and locations.
Bobcat: Oct. 17–Feb. 29.
Canada Goose: Sept. 1–30. (Note: West of U.S. 17 hunting hours extended to ½ hour after sunset.)
Crow: Wednesday, Friday and Saturday of each week through Feb. 29, 2012 and June 6, 2012 through July 28, 2012.
Hatchery Supported Trout Waters: Oct. 1 through Feb. 29, 2012.
Mourning and White-Winged Dove: Sept.3–Oct. 8.
Raccoon and Opossum: Oct. 17 (sunrise)–Feb. 29.
Rails, Gallinule and Moorhen: Sept. 1–Nov. 9.
Ruffed Grouse: Oct. 17–Feb. 29.
Squirrel: Gray and red Oct. 17–Feb. 29; fox Oct. 17 –Dec. 31 in selected counties.
Teal: Sept. 10–28 east of U.S. 17 only.
White-tailed Deer: Eastern: Bow season Sept. 10–Sept. 30; Muzzleloading Oct. 1–Oct. 14; Gun Oct. 15–Jan. 2. Central: Bow season Sept. 10–Oct. 28; Muzzleloading Oct. 29–Nov. 11; Northwestern: Bow season Sept. 10–Nov. 4. Western: Bow season Sept. 12–Oct. 1 and Oct. 17–Nov. 19; muzzle-loading Oct.3–Oct. 15
Wild Boar: Sept. 12–Sept. 30 only in Cherokee, Clay, Graham, Jackson, Macon, Swain. Thereafter there is no closed season and no bag limit on feral swine in all 100 counties.

There is no closed season or bag limit for ground-hog, coyote, striped skunk, armadillo and nutria. There is an open season for taking beaver with fire-arms or bow and arrow during any other open sea-son for the taking of wild animals.

Check the *2011–2012 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

Commission Plans New Website

Visit the new ncwildlife.org this fall for a fresh look, simpler navigation and features that make access to information and answers about North Carolina's wildlife resources easier than ever.

Whether you're a hunter, angler, boater or just simply enjoy wildlife watching, the newly redesigned website will let you quickly access licensing information, game lands maps, boating access areas, public fishing areas and other tools, information and services. We reorganized the content, streamlined navigation and improved menus so you can find what you need, when you need it.

CALENDAR OF EVENTS

FRIDAY–SUNDAY, SEPT. 9 – 18

Check out the livestock exhibits, midway rides, entertainment and the N.C. Wildlife Resources Commission's exhibit at the N.C. Mountain State Fair in Fletcher.
Visit www..org.

SATURDAY–SUNDAY, SEPT. 10–11

Learn about wildlife heritage of Currituck at the fifth annual Currituck Wildlife Festival at Currituck County High School in Barco. Show features decoy carvers, wildlife painters and exhibits.
Visit www.visitcurrituck.com.

SATURDAY, SEPT. 17

Learn about insects at BugFest at the N.C. Museum of Natural Sciences in Raleigh. Event features exhibits, activities and presentations on insects.
Visit www.naturalsciences.org.

Explore Hatteras Island's traditions and the world of working watermen during the sixth annual Day at the Docks in Hatteras Village. Festivities, including a chowder-cooking contest, run from 10 a.m. to 5 p.m., followed by the blessing of the fleet.
Visit www.dayatthedocks.org.

SATURDAY, SEPT. 24

Join the N.C. Wildlife Resources Commission in celebrating National Hunting and Fishing Day at its four education centers.
Visit www.ncwildlife.org.

FRIDAY–SUNDAY, SEPT. 30–OCT. 2

Check out the seafood and entertainment and learn about the cultural traditions that surround commercial fishing at the 25th Annual N.C. Seafood Festival in Morehead City.
Visit www.ncseafoodfestival.org.

FRIDAY–SUNDAY, OCT. 13–23

Visit N.C. Wildlife Resources Commission exhibits—including a shooting range—plus craft demonstrations, livestock exhibits, concerts, food and more at the N.C. State Fair in Raleigh.
Visit www.ncstatefair.org.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

Public Hearings Scheduled for September

The N.C. Wildlife Resources Commission will take to statewide public heari 55 proposed changes to the state's wildlife management and fishing regulat for the 2012–2013 seasons.

Proposed changes include lengthening the bear hunting season in Greene, Hal Lenoir, Martin, Northampton, and Pitt counties and opening a bear hunting seas in Edgecombe, Harnett, Johnston, Nash, Stokes, Vance, Warren, Wayne, and Wils counties. Proposals also include changing the bear season in Yadkin, Iredell, Alexar and Catawba counties and opening the portions of Cleveland, Burke and Surry cou that are currently closed to bear hunting.

The commission is also proposing increasing the general statewide minimum s limit for smallmouth and spotted bass and increasing the minimum size limit for mouth, smallmouth, and spotted bass in Public Mountain Trout Waters and wate and west of Madison, Buncombe, Henderson, and Polk counties. These changes are of an effort to standardize the general statewide minimum size limit for these spec

For full text of the proposed regulations changes, see the Proposed Changes in Fi and Wildlife Management Regulations for 2012–2013 for Public Notice and Present at Public Hearings document (www.ncwildlife.org/HotTopics/documents/2012 Proposals.pdf). The purpose of the Raleigh public hearing is to receive comments o posed changes to Falconry Permitting Rules only.

The schedule for the 2012–2013 public hearings is below. Public hearings begin at

DATE	DISTRICT	CITY	LOCATION
Sept. 6	4	Dublin	Bladen Community College
Sept. 7	5	Graham	Courthouse
Sept. 8	6	Norwood	South Stanly High School
Sept. 13	8	Morganton	Municipal Auditorium
Sept. 14	9	Clyde	Haywood Community College
Sept. 15	7	Wilkesboro	Wilkes Community College
Sept. 20	1	Edenton	Swain Auditorium
Sept. 21	2	New Bern	Courthouse
Sept. 22	3	Rocky Mount	Nash Community College
Sept. 28	Statewide	Raleigh	Centennial Campus Auditorium

Blackfin Tuna Record Broken

A Wilmington man set a new state blackfin tuna record with a 40 pound, 11 ounc caught off Wrightsville Beach in May.

Michael C. Accattato caught the fish May 10, breaking the former state record pounds, caught off Oregon Inlet in 2007. The fish measured 39 inches total length 29.5 inches around the girth. The world record blackfin tuna weighed 49 pounds, 6 o and was caught off Marathon, Fla. in 2006.

Accattato used a Shimano Stella 8000 rod and reel with a Williamson Jet poppe on 70-pound-test line. He was fishing with Capt. Richard Crosson, Jr. of Living W Guide Service in Wilmington.

For a list of North Carolina saltwater records, visit portal.ncdenr.org/web/mf/nc carolina-state-saltwater-records.

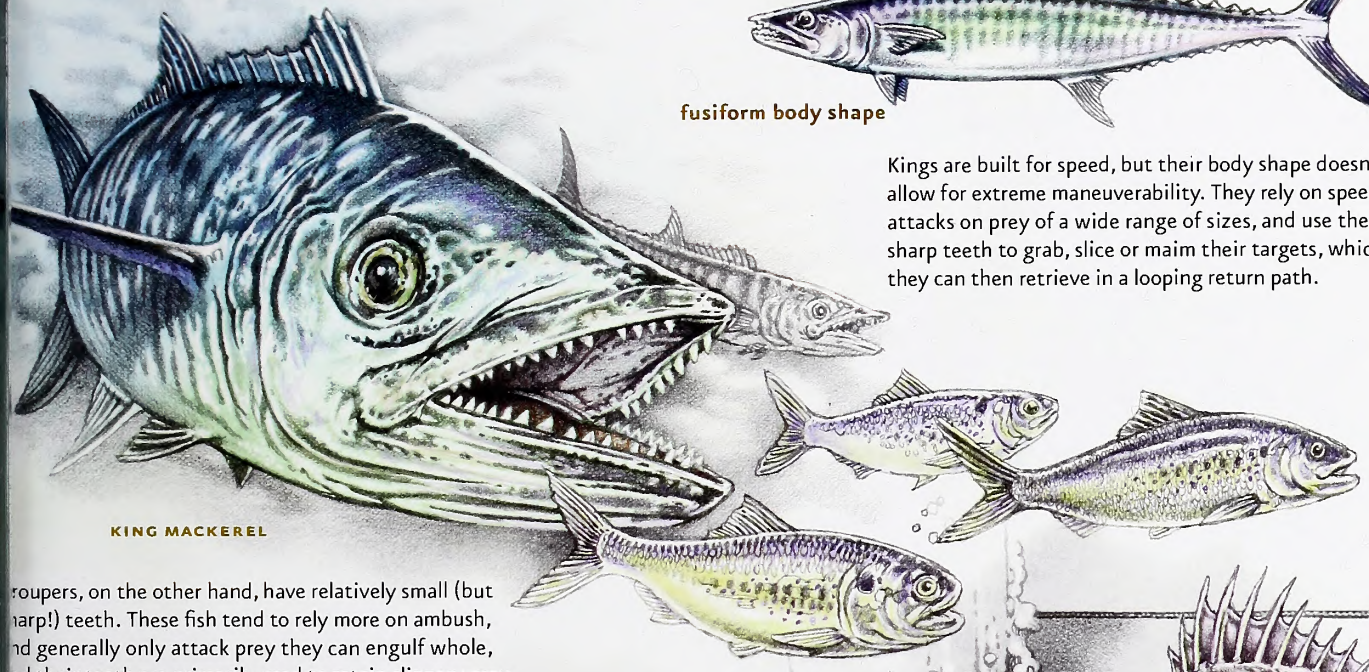
Why Do King Mackerel Have Such Sharp Teeth?

itten by Clyde Sorenson
ustrated by Jim Brown

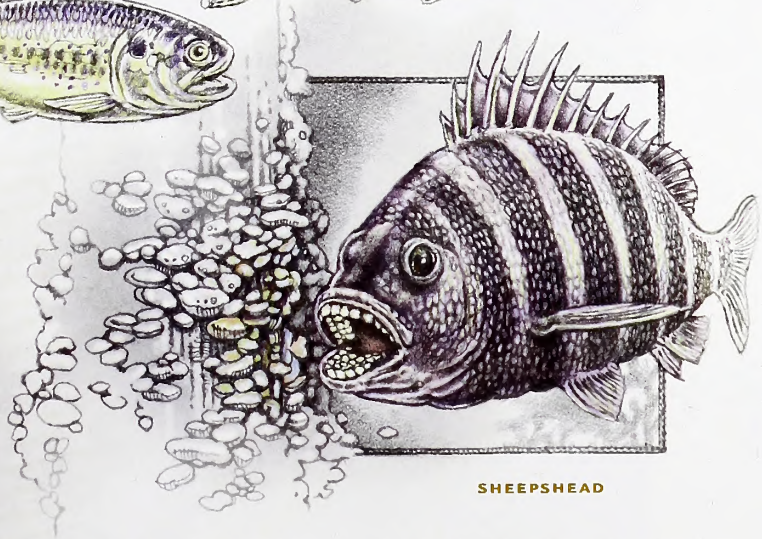
ING MACKEREL ARE ENDOWED with razor sharp teeth, a fact any a novice angler has discovered the hard way. The king's sharp teeth e related to its foraging style, as are the teeth of other fish.

The king mackerel has between 15 and 30 teeth on each side of each jaw; the number varies because they frequently lose them while hunting. The teeth are roughly triangular in shape and interlock, producing a shearing action.

Kings are built for speed, but their body shape doesn't allow for extreme maneuverability. They rely on speedy attacks on prey of a wide range of sizes, and use their sharp teeth to grab, slice or maim their targets, which they can then retrieve in a looping return path.



roupers, on the other hand, have relatively small (but harp!) teeth. These fish tend to rely more on ambush, nd generally only attack prey they can engulf whole, nd their teeth are primarily used to retain slippery prey.



The bizarre teeth of the sheepshead are used to shear barnacles and other shellfish off of hard surfaces. Their teeth also allow them to adeptly steal baits from hooks!

Jumping Monkeys and Ticks

written by Jim Dean

During one of the hotter spells of weather we had earlier this summer, my son Scott and I went to the family farm in Granville County to try to repair a lawnmower that had taken an unauthorized mechanical vacation. It wouldn't start, nor did it have a change of heart after we checked the spark plug, ensured that the battery was charged, inspected the electrical connections and determined that fresh gas was sufficiently present to encourage combustion.

ILLUSTRATION BY JACKIE PITTMAN

That is pretty much the limit of our aptitude and patience in such matters, and especially when it's a toasty 95 at noon and still climbing. More surprising, Curtis King was also stymied despite the fact that he and his wife Louise have worked shade-tree magic with ancient farm equipment around here for more than 50 years.

"I've always thought it was a bit nippy anytime the temperature dropped below 80."

There was no alternative but to seek professional help, and while Scott and Curtis carried the sullen mower to a repair shop, Louise and I sat on the porch to wait. Even in the shade, the light breeze felt as though it was blowing through a Pittsburgh steel mill.

"Look at those fields and woods," I said, marveling at the brassy shimmering haze.

"Yep, monkeys jumping," said Louise. "I've heard that all my life to describe what we're seeing."

When Scott and Curtis drove up 30 minutes later without the mower, the first thing Scott said was "Curtis says monkeys are jumping." Long have Scott and I lived in the South, born and bred here, yet neither of us had ever heard of any jumping monkeys. But like a lot of old South colloquialisms, it fits.

Certainly, there have been some miserably torrid summers and some devastating years of drought since I took over management of the farm from my father 30-some years ago, but is it just my imagination that Mother Nature is cranking up the thermostat, or is it simply because age is sapping my energy? After all, I've always thought it was a bit nippy anytime the temperature dropped below 80.

I probably ought to know better than to pick this scab, but the majority of experts say global warming is real, and that we're going to see increasing effects even if a few hot summers or cold winters don't necessarily prove anything right now. They are careful to point out that they analyze a vast and varied amount of data worldwide over a very long period of time rather than focus on shorter cycles that might be normal fluctuations. But if they are right about all the accumulating evidence—and I fear they are—even a small rise in global temperature will at some point have many significant impacts. If we think monkeys are jumping now, chances are we ain't seen nothing yet.

Regardless of what anyone personally believes about this subject and its predicted effects, we don't need an expert to tell us when it's a scorcher. Shucks, I can even predict them months in advance.

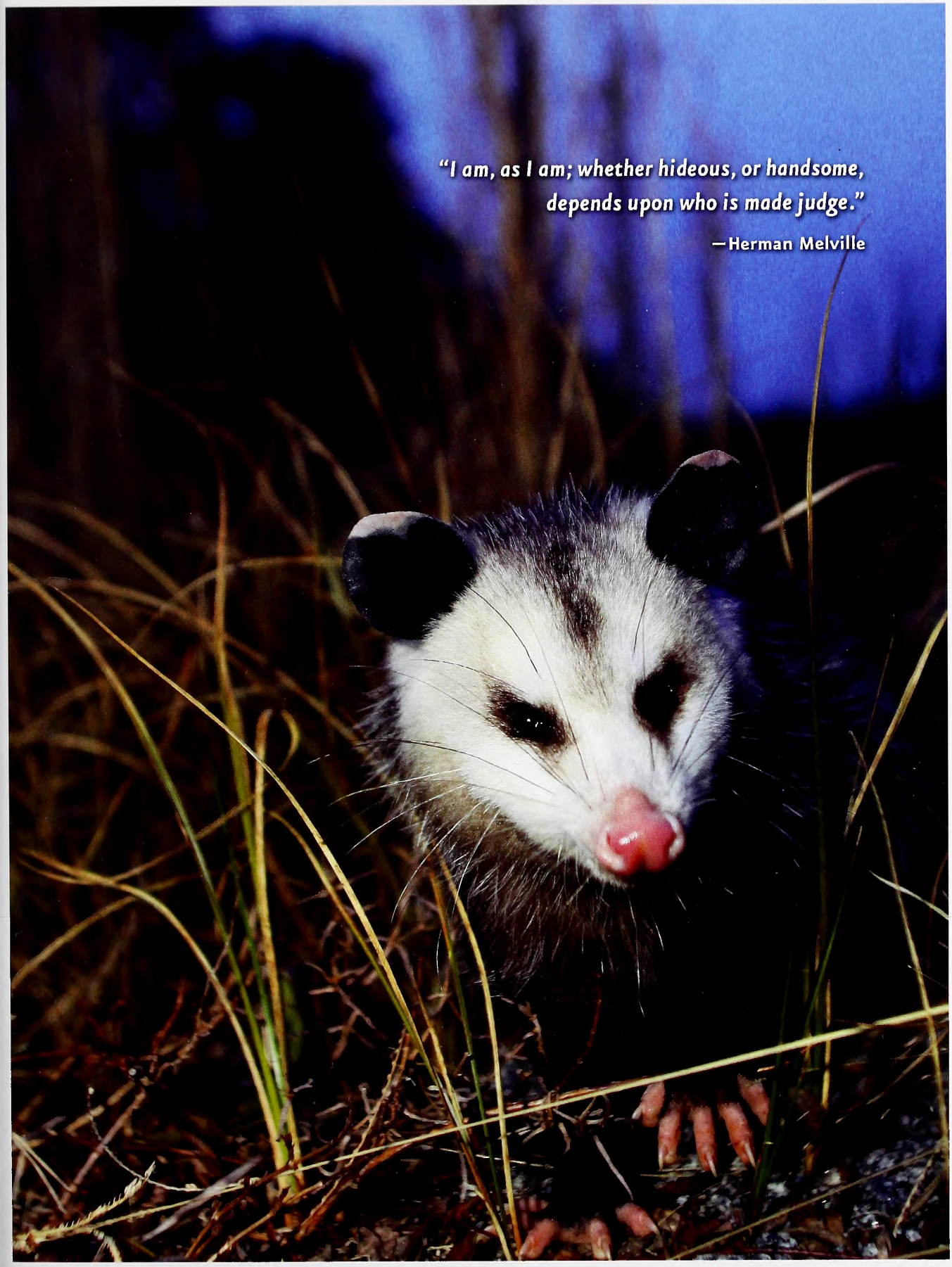
As I write this in the middle of an unseasonable June heat wave, I can promise you that the opening day (and most likely the entire first week) of the dove season in September is going to be a hot as a well-digger's . . . no, wait, wrong metaphor. It will be as hot as the hammered-down hinges of Hades. But if the corn and sunflowers have been cut, the doves will be flying, and we will be out there.

Here's another prediction. The only way I will ever bag a legal limit of doves with a box of shells is if that limit is dropped to three or four birds, which is roughly my average.

And when I claim my spot in the field slathered in sunscreen, I can be assured that I will be immediately transformed into a tick and chigger magnet. The problem isn't a big tick that you can pick off—you can usually feel them crawling. We're talking about those vast pigmy hordes of itty-bitty seed ticks that seem to be so much more common nowadays. These little guys are not much bigger than a pinhead, and fast. And sneaky. They often attack in platoons—it's not as easy to feel 'em crawling—and they know precisely where they want to go, which is the very place we least want them to go.

Clyde Sorenson, professor of entomology at NC State, says these little ticks are actually the larvae and nymphs of the Lone Star tick, and he believes their increased numbers are likely tied to expanding deer herds, and possibly even a moderating climate. Even if ticks didn't carry serious diseases, their bites itch for weeks.

Just wondering, but while we're waiting for rising sea levels to reach Kinston, could we maybe spare a couple of experts to figure out what do to about these tiny ticks? And while they're at it, they might want to find out whether there's any risk posed by a population explosion of jumping monkeys.



TODD PLISSER

Opossum

OUTDOOR MOMENT

IN THE NOVEMBER · DECEMBER ISSUE

TODD PUSSER

BIRD DIVERSITY

North Carolina is home to many species of birds, some common, some rare. Here's a look at a few of them.

FIRST IN FORESTRY

A grandson discovers relics of his grandfather's days at Biltmore, the nation's first school of forestry.

NO DOG, NO WORRY

Just because you don't have the chance to hunt grouse over a dog, doesn't mean you can't pursue these birds.

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WILDLIFE IN NORTH CAROLINA

NORTH CAROLINA Wildlife RESOURCES COMMISSION

/8

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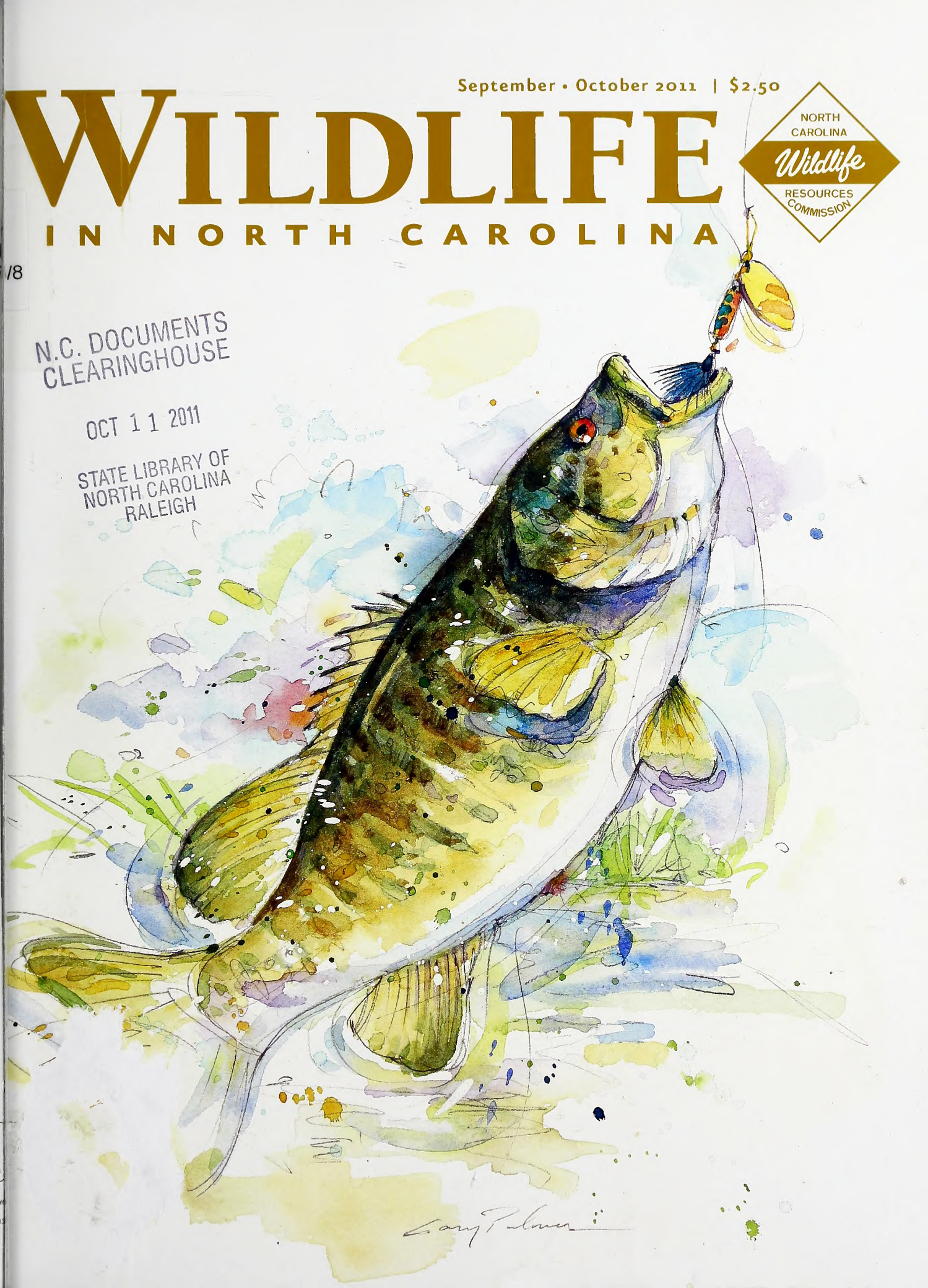
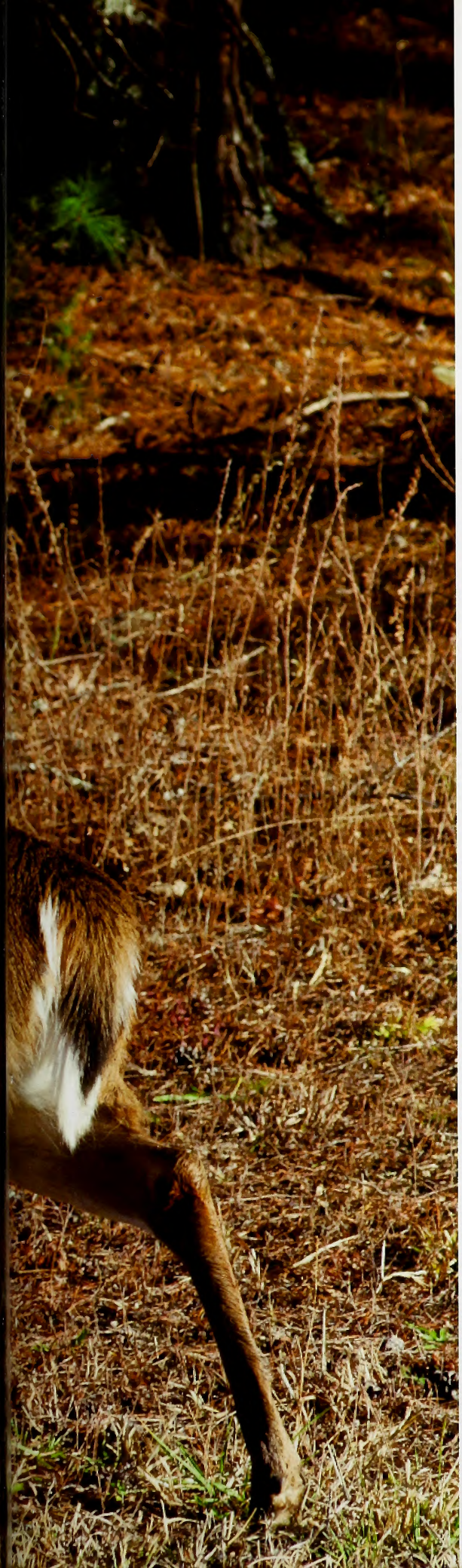


This large-antlered deer creates an olfactory cue for other whitetails by mouthing a pine limb and leaving behind the scent of his saliva.

PHOTOGRAPH BY MELISSA McGAW/NCWRC.



Volume 75 | Number 8

WILDLIFE IN NORTH CAROLINA

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Cover: The smallmouth bass is one of our state's premier game fish and has lured many an angler into a life of fishing. ILLUSTRATION BY GARY PALMER.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

September and October are curious traveling companions, as different from beginning to end as any two months of the year. September in North Carolina harbors the dried-out husks of summer. Opening day of dove season likely will be hot and sweaty and the birds will demand attention once they are down. A cold drink late in the afternoon will seem like a gift from beneficent hunting gods, or a companion who was better prepared than you.

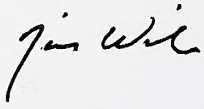
JIM DEAN

October days spent on Delayed Harvest trout streams or sitting in a tree stand will be a mix of hot and comfortable, but the month will end with the promise of winter. Most areas of our state will have experienced a frost by that time, and cold weather, interspersed with Indian summer days, will follow in short order. On a not-too-distant day, we will awake to find winter on the land and perhaps think fondly of those 90-degree days.

Although a number of hunting seasons begin in September and October, most are preludes, warm-ups, to the seasons of November and December. Hunting in hot weather is difficult and doesn't appeal to everybody, but there are opportunities galore, such as Canada geese, whitetails, grouse and three species of squirrels. Being an old-school hunter—or perhaps just old—my favorite hunting is in the cold, when the ticks and chiggers are but distant memories and the red, frozen clay of the Piedmont crunches underfoot. I figure I can stay warm easier than I can cool off.

So after dove hunting a few times, I'll spend a good part of these two months fishing. It doesn't matter particularly whether I head east to Lake Mattamuskeet or the Alligator River or west to Avery or Caldwell counties. I'm happy with either, although as the year dwindles, I'm more inclined to head toward the Coastal Plain, where warm days linger and on a good day a man can catch eight or 10 species of fish in fairly short order from the same piece of black water. He might also catch nothing, but where there is water there is promise. Sometimes promise is enough. Or as Aldo Leopold wrote, "What was big was not the trout, but the chance."

And a chance is what September and October offer us. The chance to hunt, fish or wander the woods and river banks. That should be big enough for any of us.



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ning Memories

lson's skillfully written and (as always) ly researched three-part series on fish gation in North Carolina, (April, May, 011) brought back long-forgotten mem- or me. Particularly, the third in the series over 61-year-old memories of early ry experiences.

vas in the early 1950s when Fish Division Harry Cornell and I drove practically out ne of the few runways of the Raleigh- n Airport (try that today!) and watched stern Airlines DC-3 taxi up to us with its fertilized walleye eggs from New York destined for our Table Rock Hatchery— st introduction of walleyes for North na reservoirs. Walleyes had been docu- d in the Roanoke River in the 1900s, but ng since disappeared from that river. shed the eggs to Table Rock where e Scruggs and I baby-sat the hatching round the clock for several days. Our tcheries were rather crude and antique y today's standards. Maybe it's a good we didn't realize it.

Duane Raver
Garner

sitting on my front porch reading the sue of *WINC*, I was struck by how much the articles were related, Bruce Ingram's Ribbon Stream") and Jim Wilson's ("Fish Millions"). When I first came to work 2, the Nolichucky River from the surface to the bottom was the great white way [because of mining pollution] from Spruce Pine into Tennessee. Interestingly, the restoration of the sports fishery was both due to improved water quality and the reintroduction of expropriated species. The river's remarkable recovery was due to more than just the Clean Water Act.

Thanks to local pressure by conservationists and sportsmen, such as A.D. Harrell of Red Hill, the NCDNR Division of Water Quality and EPA began to prohibit the dumping of mining waste into the river. Beginning in 1979, sportsmen, notably Tommy Anderson and Larry Carpenter of Morganton, helped the NCWRC by providing smallmouth bass brood stock from Lake James to Table Rock Hatchery. Stocking of smallmouth bass in the Nolichucky River began in 1980 and continued for three years. Musky were reintroduced beginning in 1979 thanks to the pioneering efforts of W.R. Bonner and the staff of the Table Rock Hatchery.

Bob Brown
NCWRC fishery biologist (ret.)
Morganton

I greatly enjoyed Jim Wilson's series on fish culture in North Carolina. A lot of the early stocking and hatchery work occurred on my home waters. My grandmother lived in Old Fort, so my buddy Roger Brown and me rode our bikes to Mill Creek and on occasional big trips to Curtis Creek. We imagined every deep pool held trout like we had never seen.

Now I know at one time some very interesting fish did indeed swim those waters. Thank you Mr. Wilson for a very interesting and informative series on fish management, past and present. I won't hold it against you that you omitted my favorite exotic fish (and latest obsession), kokanee salmon.

Mark Swann
Black Mountain

More Bang for the Buck

I was certainly disappointed to see that I won't be receiving my *Wildlife in North Carolina* each month. I have subscribed longer than I care to recall, as did my father before me. For the information along with the great photos, we were getting way too much bang for our buck. I can't think of any sports magazine that has rates as low as *Wildlife*, for instance Ducks Unlimited is $25.00 per year. I guess what I am saying is to charge us what this great magazine is worth and there should not be a problem. My 2 cents worth.

Bill Rose
Calypso

Last, First and Alone

I always read the last page first. Jim Dean's column in the May 2011 issue brought back memories of a southwestern Montana fly-fishing day years ago. I was fishing with my son, who at the time was guiding fly-fishermen in that area of Montana. We are both diligent catch-and-release anglers. Our October day had been very productive, catching big brown trout on streamers.

While loading our drift boat at day's end we were approached by two "Patagonian clad" dudes inquiring as to our methods and success. Jokingly I relied we had an icebox full and they were welcome to a "mess" if they needed dinner. The tongue lashing I received only ended when I showed them the empty icebox. That experience also improved my appetite for fish.

I have been a subscriber to *Wildlife in North Carolina* for longer than I can remember. I read my Dad's copies when I was a boy. My subscription has followed me to Colorado, Utah, and Georgia.

Tom Gardener
Edenton

Jim Dean's "Fishing Alone," in the July-August issue, hit the nail on the head. The solitude of being alone on the water and having a conversation with Mother Nature is priceless. You can fish at your own pace, never get out-fished, and no one will tell where you caught 'em.

Vern Parker
Washington

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The Modern SMOKEPOLE SEASON

You never forget your first deer. I guess that's one of the reasons muzzleloading season is so special to me. It was the last day of the season about 18 years ago, when I made plans to go hunting with Jeff Moore and his dad. Jeff had me climb up in a nice, straight poplar tree overlooking a patch of white oaks where deer had been appearing regularly. As the morning progressed, I didn't see a thing. As I sat looking at the fall foliage, I could hear shots in the distance, so somebody was seeing deer.

About 10:30, I heard something directly behind me. Instead of just sitting still and allowing the animals to come in, I stood up abruptly. Just then I heard a snort, and three does bounded a couple of leaps in different directions and stopped. I picked out the best shot on one of the does, took a deep breath and squeezed the trigger. The deer fell in its tracks. I had hunted for whitetails several rifle seasons prior to this moment without connecting. I was so elated; I think Jeff was as happy as I was.

I had received the muzzleloader a year before as a Christmas gift. It was a Thompson Center New Englander. I remember thinking at the time: *What am I going to do with this Daniel Boone gun?* But then it occurred to me: *This rifle will give me an extra week to hunt now.* Wheels continued to turn, and I've hunted every muzzleloading season since.

Today's muzzleloaders offer hunters advantages similar to centerfire rifles, and with the extended season, they make for a great opportunity to fill a tag.

ADVANTAGES OF MUZZLELOADING

In my area, muzzleloading season is two weeks long. Also, a hunter can harvest either sex, which gives ample opportunity to fill the freezer. The deer populations in North Carolina have grown in recent years, allowing for this. At one time, you were allowed to hunt for bucks for the first five days of a six-day season, and hunt either sex the last day.

The weather that time of year isn't too cold. You don't have to wear so many layers of clothing, which can restrict movement. A long-sleeved button-up shirt or light jacket along with a blaze orange vest will do. Some mornings in mid-October can have a light frost and then warm up nicely. But it never fails —it seems that it rains at least part of every muzzleloading season. It's well worth it to invest in a quality rain suit for this purpose, but I hate the thought of water getting near the primer. I usually keep it covered with my hand, but you can put up a special umbrella

WRITTEN BY JEREMY GRADY // PHOTOGRAPHED BY CHIP LAUGHTON

Whether a hunter uses a modern muzzleloader or a more "primitive" version of the rifle (as shown), he can enjoy extra days in the field during white-tailed deer season.

made just for deer hunters who use a climbing stand. It simply screws into the tree. The umbrella works well in light rain, but if the rain turns into a downpour, or some wind starts to blow, you can get wet.

There's no more beautiful time to be in the woods than mid-October. The turning leaves make for some pretty scenery. There have been times when I've hunted a stand location for several days and could tell a difference in the colors of the leaves. There are still a lot of leaves on the trees, so you can't see as far as you would like, but that's OK.

Muzzleloaders have come a long way in recent years. You can now buy a kit for around $300 that includes a rifle that's drilled and tapped for a scope and includes rings, bases and essentials such as bullets, powder charges, bullet starter and decapper. That's all you need to get started, and it is a lot of equipment for the price. I would suggest buying some quick loads. These are small plastic devices that hold a couple of powder charges and bullets so you can quickly reload. If you want to get really serious about it, you can spend upwards of $600 for some very nice models.

A lot of today's muzzleloaders break down like a single-shot shotgun. This allows for easy cleaning and easy placement of a primer. There are some models with a bolt that you cock back. You can place the safety on after it's cocked or pull back the bolt when you see a game animal coming. Almost all of today's muzzleloaders have what is called an inline ignition system. Basically, when the primer is discharged, it shoots fire straight into the powder charge. This is far superior to the old system, in which the fire had to make a 90-degree turn to ignite the powder. The older system used No. 11 caps, and misfires were common. With the newer system, the ignition has been upgraded to a 209 shotgun shell primer, which is incomparably hotter. The inline system provides surefire, positive ignition every time. I have yet to misfire on an animal or at target practice.

The next improvement was the premeasured powder charge. We used to have to pour black powder or Pyrodex out of a flask into a nipple, or some sort of powder measurer, several times to get an exact amount for each shot. Sometimes you did not get the same amount, causing the bullet to be less accurate. Nowadays, there are preformed powder charges in 50-grain increments. The amount of powder your rifle was designed for and the distance you're shooting determine how many charges you use. Just drop two or three preformed powder charges down the barrel, and you have the correct amount of propellant every time.

As for bullets, hunters use mostly a jacketed or solid bullet that's paired with a plastic sabot. A sabot is like a little plastic cup that the bullet sits in, which slides snugly down the barrel, with no lubricant necessary. These come paired together when you buy them. Some of the bullets are the same pistol bullets that are used for reloading. These bullets are more accurate, open up better upon impact and have better knockdown po than round balls.

The last big improvement to muzzlelo was putting scopes on them. Fortunate North Carolina hunters, scopes on mu loaders are legal. There are some state which scopes are illegal. Before the ri were drilled and tapped at the factory, s hunters tried to do it on their own, wh was a little spooky to me. Now when y buy one, it's already drilled and tapped scope. Scopes help with shot placemen better identity of the animal. Also, if yo have poor vision, a scope is vital. Mou a scope on a muzzleloader is no differe than mounting one on a rifle.

Once sighted in, muzzleloaders can accurate as some centerfire rifles. At 50 y mine shoots a three-shot group that ca covered with a 50-cent piece—plenty range and accuracy for me. Some hun want to stay more traditional and use o sights, which I can understand. It's sim to using recurve bows instead of compo bows with sights. If the scope gives the h more confidence in making a good sho harvest an animal, then so be it. It defi gives me more confidence.

After all these improvements to mu loaders, you end up with the characteri of a centerfire rifle. Muzzleloaders don't as much recoil as some centerfire rifles like a .410-gauge shotgun. In essence v the new muzzleloaders, it's almost like h two weeks extra of rifle season.

GOOD HOUSEKEEPING

The main drawback to using a muzzlel is cleaning one. This is one thing that y

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lo if you want to hunt with it for any
f longevity. To me, cleaning a muzzle-
is like any other maintenance I would
any of my hunting or fishing equip-
It's part of the actual sport. There are
eloading cleaning kits available, and
s modern rifles clean just like a bolt-
rifle. But one tried and true method
g good old hot water.
ep an old 2-quart pot that's my desig-
black powder pot. I put some water in
t, on the stove, and right before it begins
, I take it off and set it on a potholder
floor. I place the muzzle in the water
rough the breach end, insert the clean-
d, with a jag attached and cloth patch
, and just start scrubbing back and
I replace the patch after each pass until
tch stays clean. The hot water breaks
the powder residue. You can feel the
warming up, but that's okay. Swab it
dry patch and look through it. If it's
then swab a patch that has some bore
to prevent rusting. I usually
the rifle after target prac-
d after the season is over.
er movements may be a
lifferent now than in rifle
n. The rut is not on, so
primarily around food
es. This time of year, the
food source is white oak
s. Almost everything in
oods eats them, but deer
nem. My mentor, the late
Collins (see "My Friend
" Dec. 2010 *WINC*), used
me that deer feed on
oak acorns twice a day.
hite oak acorns can also
urse. If you're hunting a
of property that has an
lance of acorns, it may
rd to find which trees
er are coming to. This
re preseason scouting
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ok for trails that are
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recent traffic, and try
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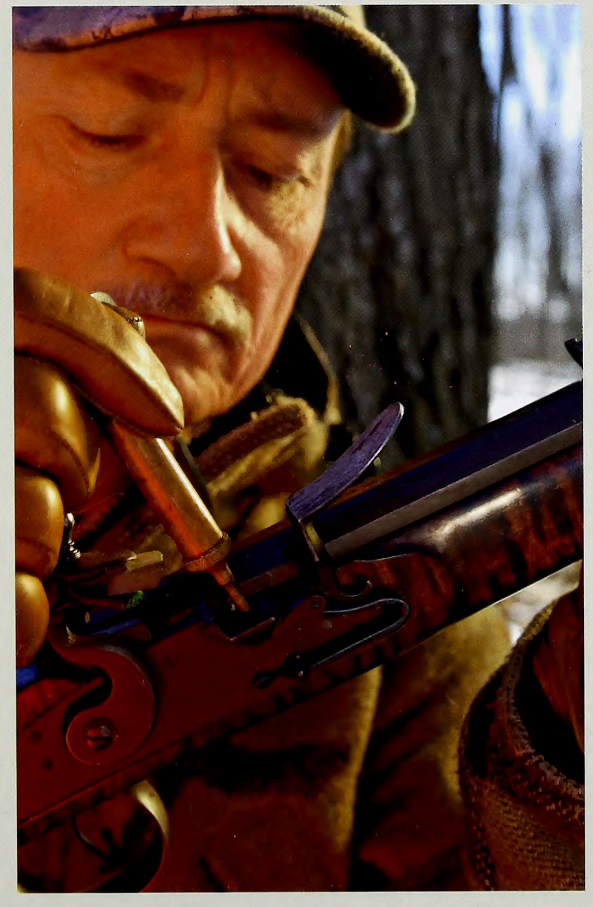
acks are going. If it looks
ne tracks are heading into
ts, they may be bedding
and that might be a good
ing stand location. If you
ome white oak trees where
's an abundance of deer
sign, that might be a good evening stand location. If it's a relatively warm day, the deer might come out right at dusk.

Sometimes you can search ridges and find buck sign. Bucks start rubbing in September, so it's possible to find fresh rubs. Again, look for trails that have the most recent activity. It's possible to see a buck slipping along heading to a bedding area after eating some acorns. My brother, Jason, harvested a nice 7-pointer one muzzleloading season. He thought he saw the deer one evening at dark, so he set up in the same stand early the next morning. Sure enough, that old buck reappeared. In that particular situation, we found both acorns and buck sign. Evidently the buck and some does were both visiting those acorns regularly, because later that same evening, Jason harvested a nice doe. A game camera is a very good aid; this will take some guesswork out of a piece of property. With a camera, a hunter can see what animals are actually there, and the times they're coming.

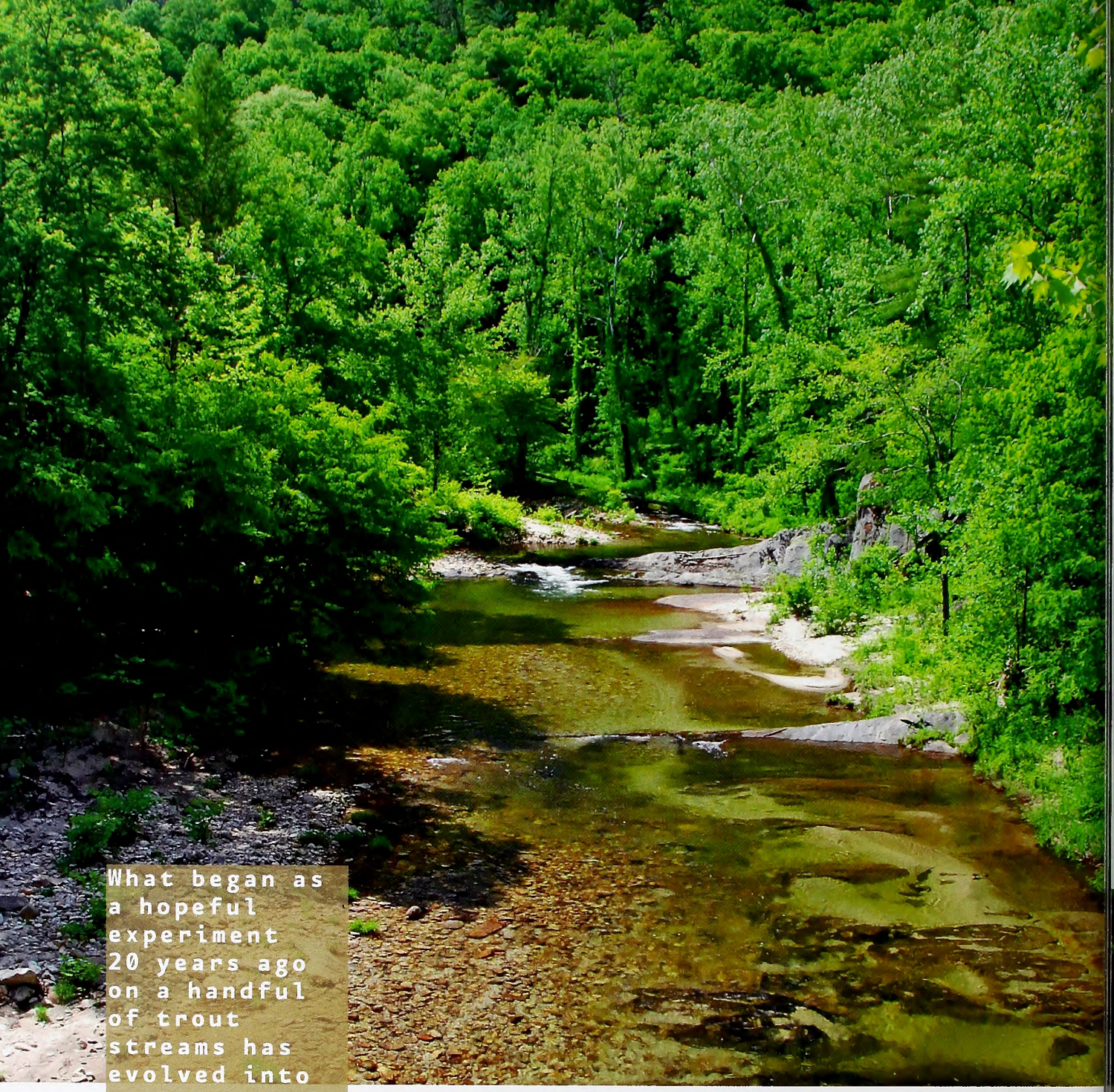
Muzzleloading season can sometimes be warm in the afternoons. I'll admit to swatting mosquitoes while on stand. This is one of the reasons I wear gloves. An inexpensive cotton pair will do. Also, I wear some sort of lightweight head net. I can still hear them buzzing, but I won't feel them biting quite so much. The other thing about the warm afternoons is that if you're lucky enough to harvest a deer, you will need to get the entrails out and the meat cooled off quickly.

With today's muzzleloaders and longer seasons, the hunter's odds for tagging a whitetail have vastly improved. And it's a wonderful way to kick off your hunting season. I wait all summer for it. There's something special about the solitude of sitting in a tree, surrounded by the beautiful coloration of the leaves, waiting for a deer to come by. It doesn't get much better than that.

Morganton's Jeremy Grady is a freelance writer and frequent WINC contributor.



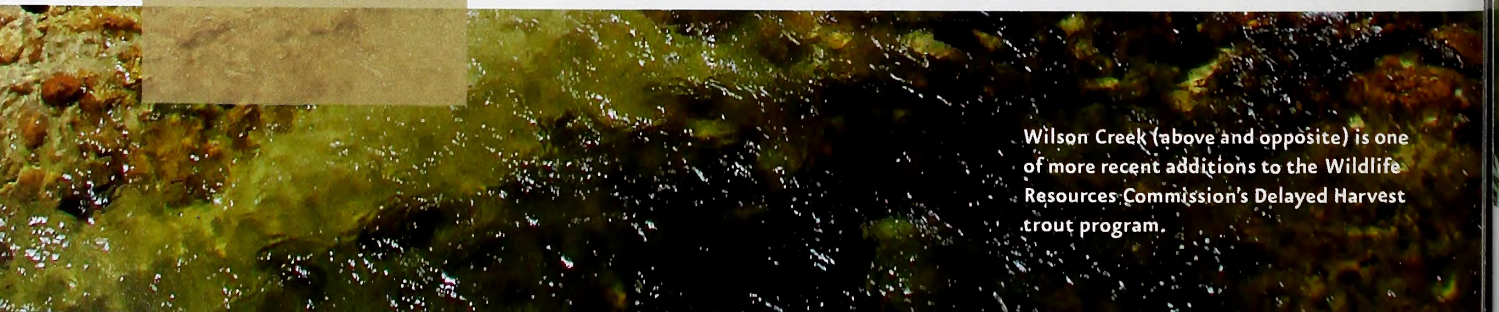
Some hunters prefer hunting with the older style muzzleloaders which require use of such as tools as nipple picks (left) and powder horns.



What began as a hopeful experiment 20 years ago on a handful of trout streams has evolved into an immensely popular program that benefits both our environment and economy.

DELAYED HARVEST DELIGHTS

Written and Photographed By Jim Dea



Wilson Creek (above and opposite) is one of more recent additions to the Wildlife Resources Commission's Delayed Harvest trout program.

The crests of the mountains that day in the early 1990s were a pale green with splashes of pink and white from redbuds and dogwoods as I headed north out of Wilkesboro. I was bound for a small stream that originates high up near Wildcat Rocks on the Blue Ridge Parkway and tumbles southeast through mature forest until it links up with the Middle Prong of Roaring River in the valley. I had fished it before, and knew it held a good population of mostly small wild rainbows that were prospering under special Blue Ridge Parkway regulations that permitted only artificial lures or flies and restricted the number of trout that could be kept.

I pulled into the parking area, gathered my gear and began the long hike up the trail to get to the more remote portions where I hoped I might not encounter other anglers. The wild trout in these small streams can be notoriously spooky, and they're nearly impossible to catch if someone is fishing ahead of you. Everywhere I wanted to fish, however, I ran into other fishermen or soon realized I was following fresh footprints—not surprising since it was a glorious spring weekend.

By mid-afternoon, I had yet to catch a trout. It was too late to drive to another similar wild trout stream (I had only one day to fish), so I began the long walk back to the car, beaten and dejected.

Maybe I ought to check out the Middle Prong before I leave, I thought. I had driven alongside it coming up the valley, but I hadn't paid much attention because I knew it was somewhat marginal water that held mostly hatchery trout stocked by the N.C. Wildlife Resources Commission. Besides, I had seen lots of fishermen. But it was my last resort, and I also knew that it was one of a handful of streams that the Wildlife Commission had recently introduced under a new experimental regulation called Delayed Harvest.

I pulled off the gravel road and watched several fishermen. Most were using spinning tackle, but one was fly-fishing. It was quickly evident that they were catching trout regularly, including an occasional sizeable one.

"Looks like you guys are doing pretty well," I said to one older fisherman who was taking a break sitting on a nearby rock.

"Yeah, I really like this deal," he replied. "I don't get around too well anymore, but this water is easy to get to, and there are always lots of fish. I don't mind turning them loose now, either, especially since I'll be able to keep some later in the year. It's about the only place I fish for trout anymore."

I drove slowly until I found an unoccupied pool, thinking I might try it for an hour. So what if these were hatchery fish and relatively easy to catch? Like that older angler, I also didn't mind releasing them—that's what I would have done with those wild fish I'd been stalking earlier. The afternoon slipped away gently, and it was nearly dark before I finally tore myself away—and well past midnight before I got home. It hadn't been the remote, wild trout experience I'd been seeking, but I had to admit that it had been lots of fun, and something I would surely try again.

Some 20 years have passed since that day, and it's a pretty good bet that every trout fisherman in North Carolina now knows how this experiment turned out.

The Wildlife Commission's Delayed Harvest program has since expanded to 21 streams and one lake as of this writing, with two more streams proposed for addition. More waters are almost sure to be added in future years. (A list of all Delayed Harvest waters and their locations, along with applicable regulations, can be found in the *2011–2012 N.C. Inland Fishing, Hunting and Trapping Regulations Digest*.)

"The Delayed Harvest trout program is by far the Wildlife Commission's most popular fisheries program, and may even be the most popular program of any type we've ever offered," says Doug Besler, mountain region fisheries supervisor.

That is a truly impressive acknowledgement for a state agency that has been managing fishing, hunting, trapping and boating in North Carolina since 1947. Indeed, it seems almost miraculous that the relatively simple adjustments in regulations that make up the Delayed Harvest concept could achieve such enormous popularity, not to mention many other

Brothers Larry Kapps (left) of Mooresville and Ken Kapps of Denver finish a day on Wilson Creek. Ken estimates he fishes the stream about 150 times a year.

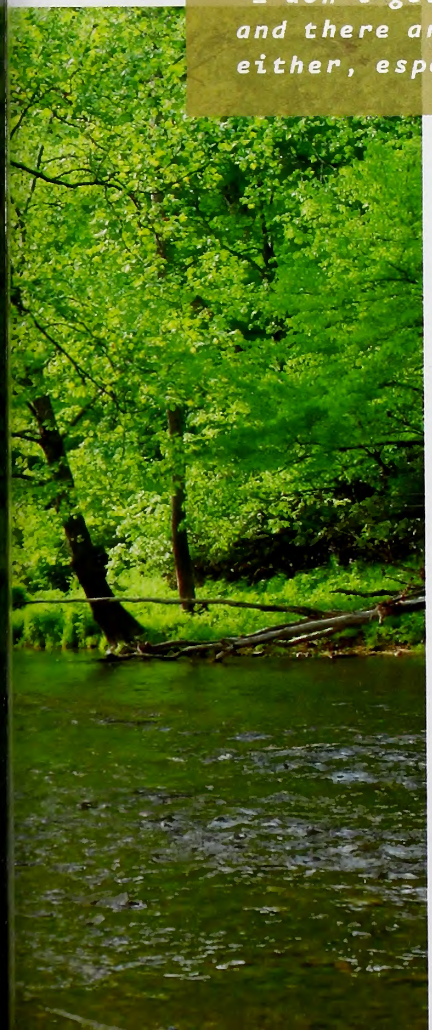
its, including some that reach beyond
g to enhance local economies.
ie current Delayed Harvest regulations
le that fishermen must release all the
they catch from Oct. 1 until the first
day in June, and they are restricted to
only a single-hook artificial lure (or
lowever, beginning on the first Saturday
ne, fishermen can keep seven trout a day
it by hook and line, with no size restric-
and no bait or lure restrictions. Nor are
any restrictions against the use of bait
es. These regulations apply through
30 of the same year, and on Oct. 1, they
revert to catch-and-release using only
gle-hook artificial lure.
ne change that went into effect this past
ner is that from 6 a.m. to noon on the
Saturday in June, the opportunity to fish
eep a limit of seven fish is restricted to
is under age 16, and they don't need a
ig or trout license (licensed adults can
npany them, but cannot fish during the
t-only period. At noon, that opportunity
extends to all fishermen and lasts until

Oct. 1. As you would expect, adults fishing these Delayed Harvest streams need a valid resident or non-resident fishing license, as well as a trout license.

At a glance, it's a very simple concept. Fishermen can fish eight months knowing that the water they are fishing is full of trout. The Wildlife Commission stocks these streams heavily with triploid (sterile) trout, and some larger trout are included. Incidentally, all Hatchery Supported and Delayed Harvest streams are now stocked entirely with triploid trout in North Carolina to protect wild stocks, particularly native brook trout (See "Fish by the Millions," June 2011 *WINC*).

During the period when trout must be released, fish stocked into these waters remain available to catch (some incidental mortality among released trout is unavoidable, but the majority of fish survive to be caught again). For the remaining four months, a daily limit of those trout can be caught and kept. Then the cycle repeats. Call it Delayed Harvest, deferred compensation or having your trout and eating it, too, it has worked wonderfully.

"I don't get around too well anymore, but this water is easy to get to, and there are always lots of fish. I don't mind turning them loose now, either, especially since I'll be able to keep some later in the year.



An angler (above) catches and prepares to release a Wilson Creek rainbow. The Watauga River (left) is an accessible and handsome piece of Delayed Harvest water.

The Delayed Harvest program does not affect or change the way the many other trout streams and waters are regulated and managed in North Carolina. There are still vast miles of Hatchery Supported streams, and also many miles of streams managed for wild trout, some of which are restricted to pure catch-and-release. Since these classifications of streams are not our subject, however, we won't get into the Wildlife Commission regulations that govern them (these are also explained in the *Regulations Digest*).

One of the most important elements of the Delayed Harvest program is that it adds to the total mileage of trout water in the state. Wildlife Commission fisheries biologists make every attempt to evaluate and select streams to add to the Delayed Harvest program that aren't already in the state trout management program.

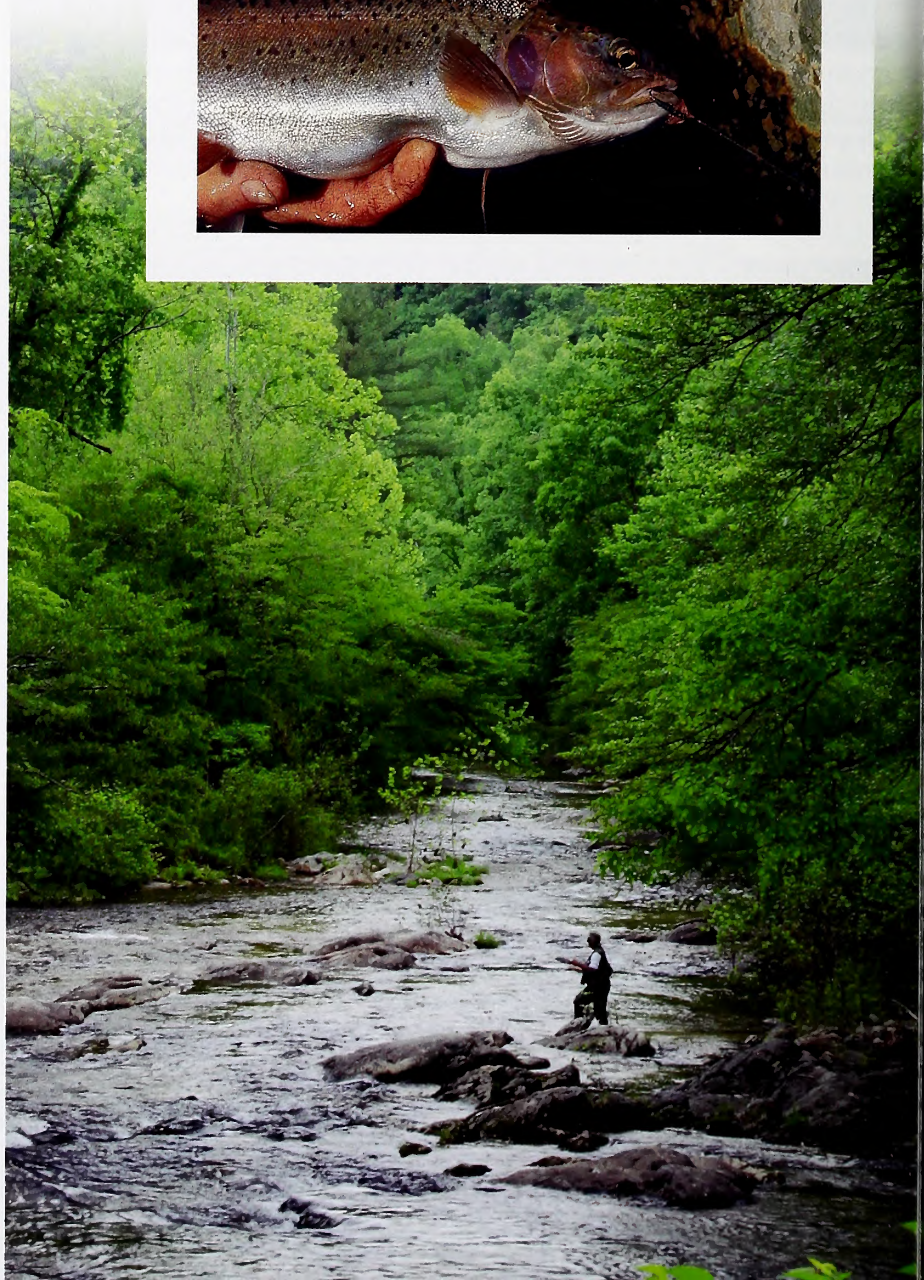
"For Delayed Harvest streams, we make a conscientious effort not to reduce the mileage of our hatchery-supported streams, but instead look for streams or stretches of streams that can be new acquisitions," explains Besler. "Typically, this is water that is marginal trout habitat that may get too warm in the summer to sustain a successful stream-bred population, but we want it to remain cool enough to keep the hatchery trout we stock alive. We're also looking for water that is easily accessible to lots of fishermen.

"A good example is the North Toe River. Spruce Pine suffered a lot of damage in the flood of 2004, so we worked with the town to get public access to 2 miles of the North Toe that flows through Spruce Pine to add to the Delayed Harvest program.

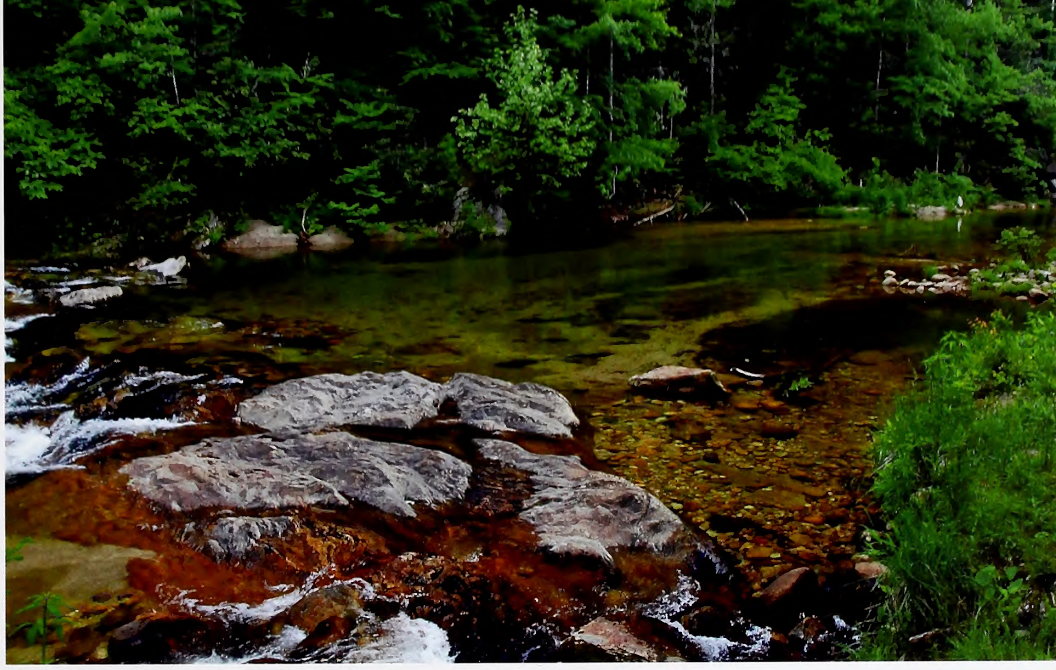
"We worked out the same sort of arrangement on Mill Creek at Old Fort," said Besler. "Another good example is the 3½-mile stretch of Wilson Creek that was part of a significant land acquisition made available through the generosity of the O. P. Lutz family. This was not previously public water, but it is now in the Delayed Harvest program, and it's extremely popular. These Delayed Harvest waters have added a new dimension and greater fishing opportunity to our overall program."

Some of the benefits provided by the Delayed Harvest waters were anticipated, but some have been a pleasant surprise. The streams are typically selected because they are accessible and generally easy to fish. That makes them especially popular among

In addition to many large, deep pools, the Delayed Harvest stretch of Wilson Creek also has lots of productive runs and riffles.



men who might not have time, or be
cally able to hike into remote streams.
is typically difficult to provide oppor-
es for disabled fishermen on streams,
e've been able to make handicapped
s possible on some Delayed Harvest
ns, and we're looking to do more of
says Besler.
layed Harvest waters are also terrific
s for any newcomer to learn to fish,
ially with a fly-rod. During the eight-
h period when trout must be released,
re also ideal places to introduce young-
o the sport, because it's an almost sure
at they'll catch fish.
ids usually haven't fished enough to
op a lot of patience, so catching fish
from the start keeps them interested
elps build confidence," says Besler.
fact that Delayed Harvest streams are
year round is also a plus. No matter
the weather is like, there always seem
fishermen out there."
ere are also environmental assets to
ed Harvest that some early advocates
t not have anticipated. For example,
men who generally prefer to fish wild
streams (and especially those who are
cates of catch-and-release) appreciate
elayed Harvest waters for another
n—these fishing spots are so popular
hey tend to draw some of the fishing
ure away from more fragile Wild Trout
s. Many fishermen believe that fishing
ish populations on some Wild Trout
s may be improving as a result.
rdly anyone, however, anticipated the
rdinary economic benefits that Delayed
st waters have created.
Ve estimate that 130,000 anglers fished
out in 2008 in North Carolina," says
r. "Trout fishermen spend an estimated
million dollars a year in this state to fish,
hat doesn't include trout fishing in the
Smoky Mountain National Park or at
herokee Indian Reservation.
lot of this can be traced to the immense
larity of the Delayed Harvest program.
timate that a Hatchery Supported stream
ibutes about $600,000 each year to
cal economy, while a Delayed Harvest
m is worth $2.2 million to the local
my. Where there are towns that have
ns running through them, or nearby,
worked hard to encourage those com-
ties to provide public access to that



The 3½-mile stretch of Delayed Harvest waters on Wilson Creek is not only productive, but beautiful. Previously this was private water.

water for angling opportunities. We're having some success because these waters can be a real asset to localities that have experienced a period of economic decline. All we ask of them is that they grant guaranteed public access to the water."

An important thing to remember is that virtually all wild trout water is on public land (national forests, parks, etc.), while 85 percent of stocked streams are on private property. Thus, when a community can work with cooperative landowners to grant stream access on private holdings for a local Delayed Harvest stream, everybody wins. Fishermen get an easily accessible place to fish where the fishing is almost always terrific, and the community reaps the economic benefits from all those visiting anglers.

With North Carolina's population growing, and more and more fishermen arriving from other parts of the country to live here, the Delayed Harvest trout program and its solid economic benefits are almost certain to continue to increase.

How, you might wonder, did all this get started? Besler credits former fisheries biologist Jim Borawa for suggesting that such a program might work here.

Borawa was stationed in Asheville as the Wildlife Resources Commission's cold-water research coordinator when he became aware that Pennsylvania was experimenting with a fledgling Delayed Harvest program—the first ever in the country. Borawa thought the idea showed promise, and he recommended that North Carolina consider giving something similar a try.

The first Delayed Harvest streams in North Carolina were proposed for the 1992 season, but the program was limited to only the spring months. Fishermen liked it from the beginning, however, and there seemed to be no unforeseen problems. Indeed, it even proved viable from a fisheries management standpoint. It was cost efficient, sites were easy to stock and there was a more favorable catch rate of stocked fish that were never expected to survive anyway (what an economist might call "a good return on investment"). In 1996, the Delayed Harvest concept was expanded to fall and spring, and since that time it has evolved into the current program and grown steadily.

Indeed, Besler and others in the Commission believe that Delayed Harvest has a long way yet to run. "There's still a lot of potential out there," said Besler. "There are streams and small lakes scattered throughout the western part of the state that could prove suitable for Delayed Harvest. Communities like Spruce Pine and Old Fort are already enjoying the long-term benefits Delayed Harvest streams can provide, and others can, too."

Perhaps the only odd thing about this is the realization that there is a government-sponsored program that apparently has nearly universal and enthusiastic acceptance. Some might argue that this is as rare as going fishing and knowing that you're almost sure to catch something. ◆

Jim Dean is the retired editor of Wildlife in North Carolina *and writes the long-running "Our Natural Heritage" column each month.*

Despite concerns about wind energy's effects on wildlife, researchers believe the impacts can be kept minimal.

Wind Energy and Wildlife

Can we catch the wind without winging the birds?

written by John Manuel

IN May 2011, the North Carolina Utilities Commission gave its approval to the so-called Desert Wind Energy Project to be located near Elizabeth City. If the project gets similar approval from other state, local and federal agencies, the flat farmland west of the NC 17 bypass will sprout 150 turbines, each one more than 400 feet tall. Collectively, they will produce 300 megawatts of electricity, enough to power 55,000–70,000 homes.

Wind has become the second-largest source of renewable energy in the U.S., providing 40,000 megawatts of electricity in 2010. Wind is a clean source of energy and, in some parts of the country, is competitive with electricity generated by fossil fuels. The majority of wind farms are located in the western and plains states where winds are strong and the land is sparsely populated. But the East Coast is entering the game, primarily because of the potential for near-shore and offshore wind development. Few states are better situated to take advantage of this than North Carolina.

A recent study by the National Renewable Energy Laboratory states that North Carolina has a wind resource of 140 gigawatts (1 gigawatt = 1 billion watts) within 50 miles of shore. That is more than twice the resource of any other state on the Atlantic seaboard except South Carolina at 86 gigawatts. Wind turbines can be erected in water 35 meters deep and more. In North Carolina, that translates into distances up to 50 miles offshore, out of sound and potentially out of sight of land. But before we throw our support behind a wind energy project on land or in the water, North Carolinians need to know what the potential impact will be on our other great natural resource—wildlife.

In general, wind turbines' impact on wildlife seems to be small. Whirling blades, whose tip speeds can reach more than 200 miles per hour, are the biggest concern, and birds and bats the principal victims. Studies indicate that mortality averages about three birds per turbine per year—a relatively insignificant amount. But some sites have proven to be virtual Cuisinarts for flying creatures. In the space of two months, biologists found more than 400 dead hoary and eastern red-tailed bats at the foot of West Virginia's Mountaineer Wind Energy Center. They concluded that the center's 44 turbines were killing between 1,400–4,000 bats per year. Studies of California's Altamont Pass Wind Resource Area show those turbines kill an average of 2,710 birds per year, including 1,127 raptors.

Impacts on wildlife are not just limited to the turbines. Each utility-scale wind turbine requires about an acre of cleared land around it, half of which will be an impermeable surface. Roads must be constructed to build and maintain the machines, and power line corridors cut to transmit the energy to a substation. In forested areas, all this land clearing can destroy a lot of wildlife habitat.

These and other factors would seem to preclude the construction of a utility-scale wind farm in the North Carolina Mountains. Numerous ridgelines throughout the 24-county Mountain region have adequate winds

to support utility-scale wind generators. But tourists and locals alike cherish their views of these ridgelines unadorned with man-made structures. A state law, the Mountain Ridge Protection Act, bans structures more than 40-feet tall on ridgelines at elevations of 3,000 feet or above. While the law exempts "windmills" from this restriction, the state's attorney general has interpreted this to refer to small-scale windmills, not utility-scale wind generators. Some local governments, including Ashe County and the Town of Blowing Rock, have raised the bar by passing laws specifically prohibiting utility-scale wind farms within their jurisdictions.

Wind developers say these laws send a message that developers should seek to locate projects elsewhere. "Our philosophy is that we want to be welcomed as a good neighbor," said Robert Propes of Virginia-based Apex Wind Energy, Inc. "If we're not going to be welcomed, that's not a battle we want to fight."

Apex and a host of other wind developers are focusing their efforts on the North Carolina coast, an area with steady winds and wide open spaces. Iberdrola Renewables, the developer of the Desert Wind project, is excited about its site in Perquimans County. "It's open agricultural land, mostly soybean and cotton fields," said Michael Clayton, permit manager for Iberdrola. "Farmers will be able to plant crops right up to the base of the turbines, so we won't be taking much land out of production." Iberdrola is reportedly paying landowners $6,000 a year for each tower they agree to host on their property.

As of this writing, Iberdrola had not completed its assessment of potential wildlife impacts of its project. Point counts of birds done at the site in the fall of 2010 revealed "nothing earth-shattering, mostly resident species like catbirds" according to John Stanton, Migratory Bird Specialist with the Southeast Region of the U.S. Fish and Wildlife Service. Stanton noted that many passerines (neo-tropical songbirds) migrate through the area in the fall and spring, flying mostly at night and descending into forested areas along the nearby Perquimans and Pasquotank Rivers during the day. Because the wind turbines will be located in agricultural fields, Stanton is not overly concerned about the impacts on these birds.

> "The intense survey of birds and other wildlife tells us where the organisms are by season and how abundant they are, but we cannot know how they will react behaviorally to the spinning rotor of a wind turbine from surveying a seascape lacking wind turbines"
>
> —*Pete Peterson, professor at the UNC Institute of Marine Studies*

Migrating waterfowl are another issue. Joe Fuller, Migratory Bird Coordinator with the N.C. Wildlife Commission, says that 3,000–6,000 tundra swans forage each winter in the complex of fields where the wind farm is planned. An equal number of snow geese use these fields intermittently. "We do not know how these birds will respond to the wind turbines," Fuller said. "It may be that they will have to go somewhere else to feed."

Fuller suspects Desert Wind by itself will not pose a major problem to wintering waterfowl. His concern is what would happen if wind farms proliferate throughout the agricultural areas of northeastern North Carolina. "It could have a snowball effect to where these birds start to lose safe, secure foraging areas," Fuller said.

To help developers, policy makers, and citizens understand the potential for wind energy on our coast, the General Assembly in 2008 commissioned the University of North Carolina at Chapel Hill to do a study assembling all relevant information. Over the next nine months, a team of more than two dozen faculty, staff and consultants searched the scientific literature, assembled data and interviewed everyone from Danish wind experts to local anglers and bird watchers

esult is "Coastal Wind: Energy for
Carolina's Future," a 370-page doc-
nt crammed with data and maps on
thing from wind speeds to military
ace to the location of oyster beds on
orth Carolina coast. Included in this
are 25 pages on wildlife impacts.
ith respect to avian species, the authors
red information on the abundance and
al patterns of birds along the coast (it
ot look at inland areas). The study divid-
ds among migrating passerines, winter
nts and summer residents.
azards to songbirds are of particular con-
as surveys show some of these species
in dramatic decline nationally. Song-
migrate along the North Carolina coast
ing and fall, generally flying at eleva-
above the tops of utility-scale wind
nes (400 feet). However, songbirds
op lower on take-off and landing and
g harsh weather, so turbines located
near shore could present problems.
birds are also attracted to lights, so the
rican Bird Conservancy and the U.S.
& Wildlife Service both recommend
vind turbines be illuminated with strobe
s rather than continuous beams.
inter and summer residents found on or
the coast include half-a-dozen guilds
espectively include cormorants; ducks,
, and swans; gulls and terns; raptors;
birds; and colonial roosting wading
. The first two groups make frequent
evel flights as they move among foraging
, and this could potentially make them
erable to wind turbines. However, the
ors cite studies of offshore wind farms
rope showing that geese and ducks see
rbines and learn to avoid them.
embers of the third and fourth guilds
de a number of fish-eaters. As with oil
offshore wind turbines act as "artificial
," attracting fish in large numbers. The
in turn, will attract gulls, terns, and pel-
.. To minimize possible collisions, the
ors recommend that wind turbines be
ned without any horizontal ledges that
l serve as perches or nesting sites..
he authors state that shorebirds and colo-
oosting wading birds should not be at
risk if wind farms are located in water
er than 4-6 meters, the minimal depth
ed for installation barges. However, they
that some wading birds make relatively
cross-water movements from night-
roosts to foraging grounds. Placement of
farms in these routes should be avoided.

Given the experience with bats in West Virginia and elsewhere, wildlife officials are concerned about these species of mammals. Wind turbines appear to attract insects and with them, bats. The authors presume that the farther offshore a wind farm is located, the less likely it is to be a threat to bats, but they say there is little data to support that assumption.

The study addressed possible impacts on marine mammals, including dolphins, whales and manatees. The authors state that the mere presence of a wind turbine is unlikely to pose a threat to these animals.

After compiling all of the information on distribution and behavior of birds and bats over the coastal waters of North Carolina, the authors constructed a map indicating likely areas of high risk, moderate risk, and low risk for negative interactions between wind turbines and aerial fauna. The authors designated as high risk a buffer zone extending 2 miles out from all sounds and ocean shorelines. That buffer is intended to protect passerines, shorebirds and bats on takeoff and landing.

The entirety of Albemarle Sound and much of Pamlico Sound—prime overwintering grounds for ducks and waterfowl—is also classified as high risk, along with the Alligator River, Pea Island, Cedar Island and Swan Quarter National Wildlife refuges. Inlets, which are known hotspots of biological activity, have been classified as high risk to a distance of 5 miles from the center of the inlet. Large zones off of capes Hatteras, Lookout and Fear are also designated as high risk.

The authors also compiled a map to identify and protect key fish, fishery and marine habitats. Offshore wind turbines can actually be a boon to fisheries through the artificial reef effect. Approximately 48,000 square feet of rock are placed at the base of wind turbines to prevent scour. In near-shore environments, these rocks would attract oysters and mussels, and their predators, namely sheepshead and black drum. In the ocean environment, these rocks would attract bottom dwellers such as snappers and groupers, and pelagic predators such as king mackerel. In other areas, however, the construction could damage or interfere with fishing and fish habitats. High Risk areas include primary and secondary nurseries, strategic habitat areas, artificial oyster reef sanctuaries, shell bottoms, live bottoms, wreck habitats and submerged aquatic vegetation.

For all the information they gathered, the authors of "Coastal Wind" point out that the conclusions they reached about possible interactions between wind turbines and wildlife are largely hypothetical.

"The intense survey of birds and other wildlife tells us where the organisms are by season and how abundant they are, but we cannot know how they will react behaviorally to the spinning rotor of a wind turbine from surveying a seascape lacking wind turbines," said Pete Peterson, professor at the UNC Institute of Marine Studies and one of the lead authors of the study. "There's a lot we don't know about things like risk to birds at night and the effect of lights.

"At the same time, we don't know what mitigation procedures we could successfully use, like painting turbines different colors to make them more visible or using strobe lights instead of continuous lights so as to attract fewer birds at night. Overall, I think it's fair to say that we will be able to find places over the eastern Pamlico Sound and coastal ocean where we can use wind energy without undue impacts on wildlife." ◆

Freelance writer John Manuel is a longtime contributor to Wildlife in North Carolina.

the **FASCINATION** began at *five*

Written by
BRUCE INGRAM

Illustrated by **GARY PALMER**

Beginning with early secretive trips, fishing captured the imagination of a young boy and never let go.

At the age of five, I began a lifelong fascination with the magic of moving water, sneaking away from my parents' house and slinking down to Gish's Branch (an incredible distance of 150 yards), where I seined minnows with a window screen. Minnows with brightly colored sides I labeled rainbow trout; every minnow with fat sides I called a sunfish; every other finned creature was lumped into the generic category of bass. I also built small rock dams, where I corralled fish and was always mystified when they had not stayed put after I came back a day or two later.

By the time I was 9, I had begun riding my red Schwinn a whole mile down to a Roanoke River tributary, which Gish's Branch emptied into. For a few glorious weeks, I caught chubs and redbreast sunfish by dangling chunks of worms (several rainy mornings they had made the mistake of lingering too long after sunrise on our driveway) beneath a golf-ball-size red-and-white bobber. But I soon became desirous of bigger quarry.

A peer had regaled me with tales of incredibly sized fish—he called them smallmouth bass—that reached a fantastical 10 inches long and swam in a pool another half a mile distant from home. I became obsessed with taking this trek and finally succumbed to the wanderlust that exists in many young boys—and no doubt in many girls as well.

I arrived at the pool one sunny Saturday morning and hurled a gob of crawlers toward the heart of the hole. I reasoned that bigger fish would want bigger bait, not a bad maxim, really. However, a sycamore intercepted the squirming mass—something that trees still do today. Unfortunately, this sycamore was no ordinary one, as a hornets' nest resided in its lower limbs, and the winged attackers soon found the source that had disrupted their universe.

Covered in stings, I knew that I would not be able to conceal from my mother's prying eyes what had happened. Since my parents' wrath was now assured, I decided to move downstream, catch some sunfish, bring them home and demand them for dinner.

My parents did not like fishing or fishermen. Earlier, Dad had pronounced, "Boy, you'll never make any money fishing," and mom had said that all fishing would earn me was "bee stings and snakebites," and she was half right already. Both had proclaimed that fishing was the pastime of idlers, wastrels and ne'er-do-wells.

Of course upon my arriving home, Dad whipped me with several prime switches cut from our forsythia (it was debatable whether the stings or the switching hurt worse), but Mom cooked the sunnies. Depression-era survivors, they felt it was a sin to waste good food.

It was afterward, and after much reflection and nursing of my many wounds, that I came to one of those proverbial forks in the road: whether to obey my parents' commands regarding fishing or blatantly disobey them. Some words from Mark Twain's "Huckleberry Finn," spoken by a boy about the age of me, neatly sum up my dilemma and what fork I decided to take.

"I was a-trembling, because I'd got to decide, forever, betwixt two things, and I knowed it. I studied a minute, sort of holding my breath, and then says to myself: 'All right, then, I'll go to hell.'

"It was awful thoughts and awful words, but they was said. And I let them stay said; and never thought no more about reforming."

So as soon as a respectable amount of time had passed after the hornet incident, I resumed sneaking away to ride the Schwinn down to the creek. The

My parents did not like fishing or fishermen. Earlier, Dad had pronounced, **"Boy, you'll never make any money fishing,"** *and mom had said that all fishing would earn me was* **"bee stings and snakebites,"** *and she was half right already.*

problem became, though, that I could not catch any of the smallmouths, causing both my frustration and my fascination and obsession with this game fish to grow.

Day after day I would hurl the conglomeration of worms out to the creatures, and day after day they would ignore the mass. I have always suspected that my parents knew I was disobeying their strictures, but they seemed to have come to a tacit understanding that I could not be dissuaded from fishing. It was as if they had given up hope of my ever having a respectable hobby.

Five years passed, and I became adept at catching rock bass, redbreast sunfish and even chain pickerel, but still no smallmouths. It was then that I sought out the wisdom of a very worldly 16-year-old, practically a man, who had been rumored around school to have caught a half dozen or maybe even more bronzebacks during his long angling career. His name was Rick, and he also possessed a car, a blue 1957 Ford station wagon, which gave him access to a countryside far more remote than what I could travel to on my bike.

Rick promised to take me stream smallmouth fishing, and on a May Saturday we deposited our rods (mine the classic Zebco 33 spincasting outfit, his one that I had never seen but had heard about—a spinning rod) in the station wagon. Rick's destination was the same creek that was my home water, but his favorite fishing hole was 10 miles farther away and up and over a mountain.

When we arrived, Rick proudly opened an Old Pal tackle box, and inside was an incredible array of fishing gear. The box contained the same types of bobbers, hooks, swivels and sinkers I possessed also flaunted what seemed an astronomical num of lures, six in fact, that Rick explained his dad h given him over a period of years. They included th Mepps spinners with gold, silver and bronze bla (my mentor revealed that he used different-colo blade baits for different-colored water), two red-a white Daredevil spoons, and something he calle Shyster spinner that sported squirrel hair attach to its treble hooks.

Rick offered to let me use the Shyster but war that I would have to pay him two bits (a quarter I lost it. He then said that I was to fan cast—a te new to me that Rick explained meant casting to different spot each time in a systematic manner.

For some 45 minutes, we hurled our respecti lures around the creek, with my Shyster produci no better than Rick's Daredevil. But the whole ex rience was intoxicating to me, as surely this wa the euphoria that came with being part of the ad world of fishing.

And then the life-changing event occurred. I f a solid thump on the line, the Zebco rod bowed a yards away a monstrous fish cleared the surface. F yelled "Big smallmouth on," and I frantically hor in the leaping, lunging creature, beached it and grabbed the flopping fish.

Rick took a tape measure from his tackle box soon pronounced that the smallie measured 9 inch a lunker for sure. He also declared that I was to release the smallmouth, as the species was not to casually creeled like sunfish and chubs, that ba were special and could be caught over and over aga perhaps even by me. Trembling, I freed the brow bass, an experience that made me feel good insid and hopeful that I would indeed catch that same again. The release also had the tangential benefit eliminating the evidence that I had been fishing.

I immediately offered to buy the Shyster fro Rick. He declined, saying that I couldn't possib have enough money to acquire the lure, but aft wrangling for some minutes, I finally purchased for 50 cents. Later, on the way home, I determin that I could hide the Shyster from my mom by depositing it under my bed. Many of m peers had begun hiding "girly magazin under their beds; my equally sinful secret was to conceal an assortmen of fishing lures.

Being two years older than I was, Rick had lim ited time to spend with 14-year-old like me. B had witnessed how mu a vehicle could increas one's chances for anglin

cess, and I knew whose wheels could help me ieve it—my Granddaddy Willie's.

Growing up, I had two role models: University of th Carolina basketball coach Dean Smith, who greatly influenced the way I teach high school lents, and Granddaddy Willie. The latter did care anything about fishing, but he also did not rove of how his son, my father, would rail against nd refuse to take me.

So that summer, Granddaddy and I planned an , secret excursion to the New River. Granddaddy dly gave me some money, which I used to buy a that even Rick did not possess—a Rebel Min-, a classic hard-plastic stickbait. On the day of adventure, Granddaddy picked me up and told parents that we were "going riding" (an extremely iest man, he would never have lied to my parents, he understood the wisdom of concealing the h), drove us to the New River, said he would ch me from the shore, and told me to go wade ing and have fun.

All those formative years of wading Gish's Branch ed me well that day on the New, as I already knew v to drag my feet across the substrate slowly and ly, so as not to disturb the multitude of creatures lived there or create the ripples that would alarm nearby smallmouths. For three hours, within nt of my grandfather, I waded the New, using the el to catch two fine smallmouths, an honest cher and one slightly smaller. In my angling l, I now felt that I truly could refer to myself as ass fisherman.

When I became old enough to begin the process arning a driver's license, I did so initially not to e girls but to broaden my fishing horizons. My dad a small used car lot from our house, so when I ned a license, he allowed me to drive what he claimed was the worst car on the lot, a shabby-king, red 1965 Chevy Malibu convertible that ured gashes in its rollback canopy, signs of mul-e fender benders and a missing left rear hubcap.

Dad knew I was using the car for my fishing editions, and I knew he knew, but we never ke of the other's knowledge, so a sort of uneasy ce developed between us. But he did assert his ental authority after one ill-begotten trout-fishing in which I drove a then-unheard-of distance of miles from home.

Two buddies and I had decided to spend an April urday at a trout stream, and we determined that eat the crowds we would rise well before sunrise l begin the long trek. On the way there, part of Malibu's decaying canopy peeled off in the dark l landed who knows where. Soon after we arrived, of my cohorts fell in the creek. I did the same r, and the result was that upon my arriving home, Dad found a car with part of its roof missing, wet seats and muddy floorboards. He sold the Malibu within a week and in its place gave me a car he called Goldfinger.

Goldfinger, so named in part because it was a yellow 1963 Ford, had a broken gas gauge and gobbled fuel like no other vehicle I have ever driven. It was named Goldfinger also because Dad had jokingly remarked that only the like-named James Bond character could afford to drive the Ford with its extravagant gas consumption.

Never knowing how much gas Goldfinger held in its tank, and knowing whatever there was inside would soon be expended, I was constantly stopping at filling stations to replenish the supply, and even then the car frequently ran out of gas while I was on my fishing trips. Thus Dad had once again hampered my wanderlust without ever saying a word.

Years more passed and I graduated from college, found a place to live and eventually became infatuated with a female who stirred my soul even more than smallmouths did—no small feat. For our third date, I asked Elaine to go smallmouth fishing with me. She said yes, and later she answered again in the affirmative when I asked her to marry me.

Now much has changed in my life. Besides becoming a teacher, I also became an outdoor writer, proving my father incorrect when he said I would never make any money from fishing. Mom even became quite proud of my writing, subscribing to magazines if they ran her son's stories and purchasing my books on river smallmouth fishing to give to friends.

Elaine and I have two wonderful children, and Sarah and Mark enjoy fishing, although they are not as fanatical as I am about this most marvelous pastime. We live on a rural property that a smallie stream flows through and own another parcel that features a headwater spring of the New River. And today, at 58, when I go fishing it is almost always to streams where I seek smallmouths and trout. Because for me, the fascination began at five. ◆

Bruce Ingram is a regular contributor to Wildlife in North Carolina *magazine. Contact him at be_ingram@juno.com.*

North Carolina Hunting Seasons 2011-2012

SPECIES		HUNTING SEASON	DAILY LIMIT	POSSESSION	SEASON
BLACK BEAR		See *Regulations Digest, P. 45*	1	1	1
DEER[1]			6	6[2]	6[2]
	Archery	Sept. 10–Sept. 30 (Eastern) Sept. 12–Oct. 1 and Oct. 17–Nov. 19 (Western) Sept. 10–Oct. 28 (Central) Sept. 10–Nov. 4 (Northwestern)			
	Muzzleloading	Oct. 1–Oct. 14 (Eastern) Oct. 3–Oct. 15 (Western) Oct. 29–Nov. 11 (Central) Nov. 5–Nov. 18 (Northwestern)			
	Gun	Oct. 15–Jan. 2 (Eastern) Nov. 21–Dec. 10 (Western) Nov. 12–Jan. 2 (Central) Nov. 19–Jan. 2 (Northwestern)			
	Urban Archery Season	Jan. 14–Feb. 18	See *Regulations Digest P. 55*		
WILD BOAR		Sept. 12–Sept. 30[3]	1	1	2
FERAL SWINE (HOGS)		No closed season or bag limits			
WILD TURKEY	Male Or Bearded Only Youth Hunt (Male Or Bearded Only)	April 14–May 12 April 7 *(statewide on private land)*	1 1	2 *(Annual bag limit is 2 wild turkeys.)*	2
EARLY CANADA GOOSE SEASON		Sept. 1–Sept. 30	15	30	None
DOVE	(Mourning & White-winged)	Sept. 3–Oct. 8 (noon until sunset on Sept 3; thereafter, shooting hours are ½ hour before sunrise until sunset) Nov. 21–Nov. 26 Dec. 17–Jan. 13	15	30	None

IES		HUNTING SEASON	DAILY LIMIT	POSSESSION	SEASON
, MOORHEN & NULE	Moorhen & Gallinule	Sept. 1–Nov. 9	15	30	None
	Clapper Rail, King Rail	Sept. 1–Nov. 9	15	30	None
	Sora Rail, Virginia Rail	Sept. 1–Nov. 9	25	25	None
Y TEAL SEASON[4]		Sept. 10–Sept. 28 (east of U.S. 17 only)	4	8	None
MON SNIPE		Nov. 14–Feb. 28	8	16	None
DCOCK		Dec. 15–Jan. 28	3	6	None
GRAY SQUIRREL		Oct. 17–Feb. 29	8	None	None
QUIRREL		Oct. 17–Dec. 31 (only in 23 counties; season closed elsewhere; see *Regulations Digest*, P. 57)	1	2	10
IT ling Box Trapping		Nov. 19–Feb. 29	5	None	None
L		Nov. 19–Feb. 29	6	12	None
ED GROUSE		Oct. 17–Feb. 29	3	6	30
SANT Pheasant Only		Nov. 19–Feb. 1	3	6	30
OON & OPOSSUM[5]		Oct. 17 (sunrise)–Feb. 29	No restriction on opossum; see *Regulations Digest*, P. 57, for raccoon		
AT[5]		Oct. 17–Feb. 29	No restriction		
		Nov. 19–Jan. 2 and Jan. 7–Jan. 28	Limited to certain counties, see *Regulations Digest*, P. 57		
ATORY WATERFOWL		Federal regulations may be obtained at www.ncwildlife.org or by calling toll free 1-800-675-0263 after Labor Day			
TE		No closed season or bag limits. Electronic calls allowed			
NDHOG		No closed season or bag limits			
RIA		No closed season or bag limits			
ER		See *Regulations Digest*, P. 58			
V		Wed., Fri., Sat. of each week from Aug. 3, 2011 through Feb. 29 and June 6, 2012 through July 28, 2012. See *Regulations Digest*, P. 59, for additional holiday hunts. No bag limits			
ED SKUNK		No closed season or bag limits			
ADILLO		No closed season or bag limits			

2011–2012 North Carolina Inland Fishing, Hunting & Trapping Regulations Digest for approximate boundaries of Eastern, Central, Northwestern and Western deer ons. For a copy of the *Regulations Digest*, write: N.C. Wildlife Resources Commission, 1722 Mail Service Center, Raleigh, NC 27699-1722 or visit www.ncwildlife.org.
Regulations Digest P. 55 for buck bag limits.
Cherokee, Clay, Graham, Jackson, Macon and Swain counties.
udes blue-winged, green-winged and cinnamon teal.
bobcat, raccoon and opossum seasons are closed in the Harmon Den and Sherwood bear sanctuaries in Haywood County.

RALPH HENSLEY

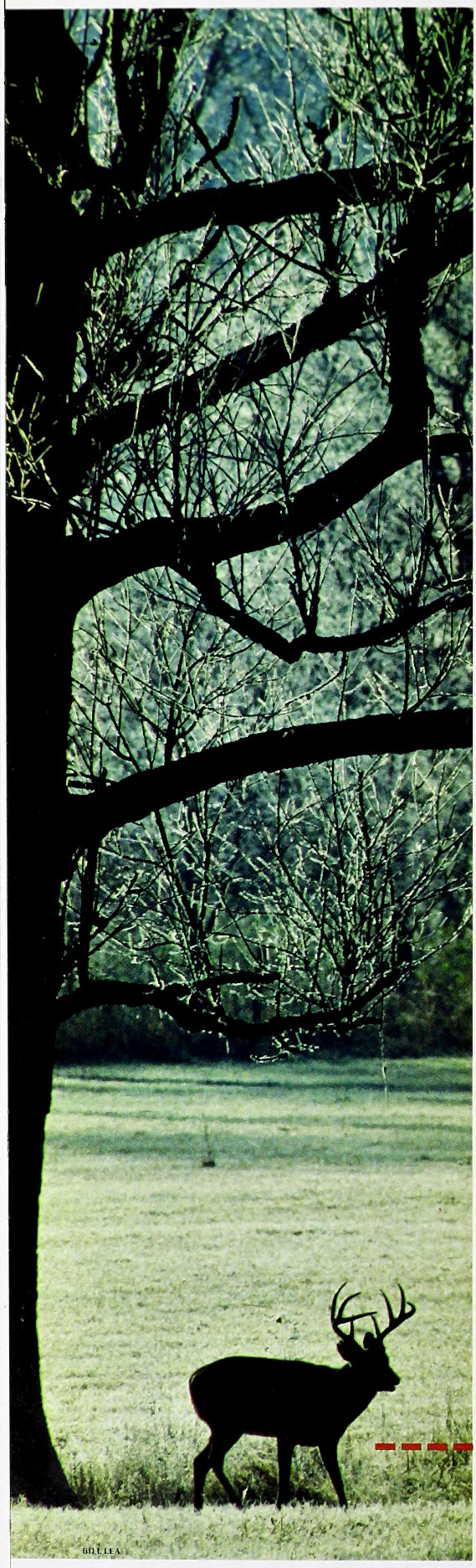
COOPERATING FOR BIGGER BUCKS

WRITTEN BY MARTY SHAFFNER

o what if you don't have 1,000 acres to manage as you please,

WORKING WITH OTHER HUNTERS CAN HELP IMPROVE THE QUALITY OF LOCAL WHITETAILS.

It had been an uneventful morning on opening day of the 2009 gun season, until around 8 a.m. I saw movement on the far ridge line. A deer was moving with the steady walk of a rutting buck on the prowl. My binoculars confirmed what I first thought: It was a buck, but because of his steady pace and the thick trees, I couldn't tell how big his rack was or his age. I followed him in the binoculars until he paused in a small opening, where I got a good side view of his rack and was able to tell he had really good G2 tines, but I still couldn't determine his age or the true size of his rack.



I passed on the shot, one most North Carolina deer hunters would have taken. I passed because the year before I had made a hasty choice to take a buck that gave me a quick look from behind, only to find he was a 2½-year-old, 14-inch-wide 8-pointer. He was precisely the kind of deer we are trying to leave on the property. A deer that in another year or two would probably score around 120 Boone and Crockett points, a very respectable deer almost anywhere, but especially in North Carolina. Being it was my first year hunting on the property, the guys I hunt with let me chalk it up as a newbie mistake, but I was determined not to let it happen again. A few seconds later the buck melted into a sea of mountain laurel, and the only deer I saw all morning was gone.

I was full of expectations when I returned to the same stand that afternoon, but several hours later, as the sun sank below the ridgeline of the Eastern Continental Divide, I had yet to see a deer. Even though I had 30 minutes of legal shooting light left, the high hopes I had earlier were pretty much gone. I sat pondering my lack of deer sightings and wondering why, when out of the corner of my left eye I caught movement. I turned my head to see a deer working around the ridge with its head down, sniffing the ground, and saw two tines sticking out from behind a tree. I figured it to be a smaller buck, but as it emerged from behind the tree, I could tell it was my lost buck from the morning hunt.

I shouldered my rifle and found the buck in my scope. As he worked his way along the trail, which had several rubs and scrapes on it, I followed him in the scope, trying to determine his age, but couldn't quite make up my mind whether he was 3½ or 4½ years old, though his rack looked even better up close than it had earlier. The buck made his way behind a fallen oak tree top where a scrape was located. In the scope I could see him sniffing the scrape, and then the buck raised his head to mouth the licking branch, and immediatcly all doubt evaporated. He wa shooter. The only problem now was I hac shot. The buck's vitals were obscured by thick brush of the treetop. A few intense onds later the buck turned to leave and res his search for does, no doubt. As he emer from the brush, the crosshairs settled on big buck's shoulder, and I quickly squeez the trigger.

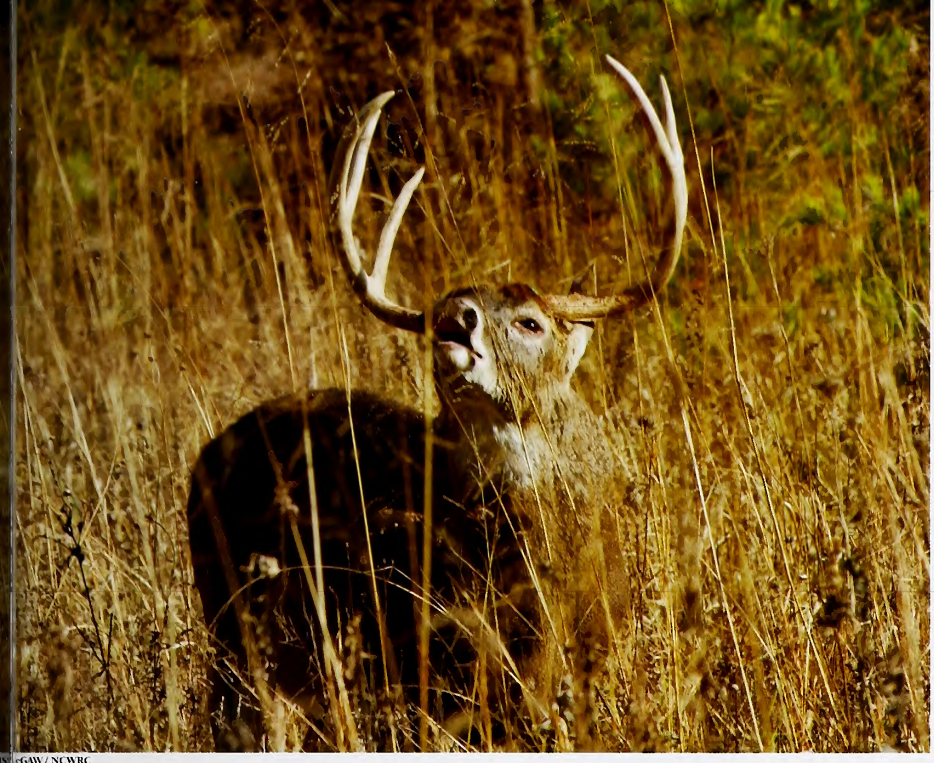
The shot from the .270 shattered the silence of the late-evening woods. The b deer disappeared behind some small wh pines but was stumbling as he went out sight. I gathered my gear and lowered it d by rope. When I got to the spot where t buck was last seen, the trail was easy to f low and quickly lead to the deer. As I wal up to him, grasped his antlers and lifted th to see if my assumptions about his rack w true, I saw they were. In fact, the more I s ied the rack, the bigger it looked. (I later jo to my hunting buddies that it was the ou buck I ever shot that got bigger when I wal up to it.) The 8-pointer had an 18-inch in spread, long heavy beams and back tines 9½ inches and scored 126¾, by far the big buck of my deer hunting career.

I got lucky, or did I? There was some l in being in the right place at the right ti but the fact that a buck of that quality wa the property wasn't luck but planning. I too many years ago this area was known lots of deer but few big bucks. So what h pened to turn the area around? More th anything, it was just a change in attitude

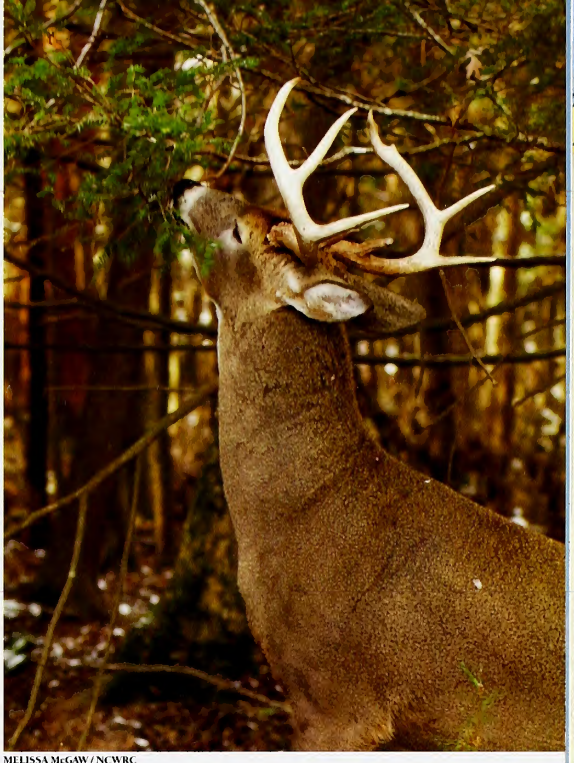
For many years hunters here harves every buck they saw, regardless of age or r size. Then the four deer hunting clubs t leased the land started passing on small racked young bucks and in just a few yea started tagging bigger bucks. These four c created a large block of land where you bucks were protected and allowed to mat I know what most readers are thinking: Th nice, but the land I hunt is only 75 acres 40 acres or even 20 acres, so this won't w

There was some luck in being in the right place at the right time,

BUT THE FACT THAT A BUCK OF THAT QUALITY WA ON THE PROPERTY WASN'T LUCK BUT PLANNING.



eGAW / NCWRC



MELISSA McGAW / NCWRC

e. But it can if you and other hunters
andowners around you form a kind of
). When people who hunted the smaller
of land around these hunt clubs saw the
s that were being harvested and were
ated about what the clubs were doing,
ea caught on. The hunters who owned
sed smaller tracks of land started passing
ung bucks also, and the next thing they
; almost the whole community had a
ent mindset. In just a few years, bigger
s began being harvested.

u hear a lot of talk about deer herds
ng better genetics, but age is where it
rts, especially in the South. Most deer
gists now say that it is almost impos-
to regulate the genetics of a wild deer
Not too long ago biologists thought that
rger, more mature bucks did the lion's
of the breeding, but genetic testing on
leer herds show almost all bucks con-
e to reproduction. So what you have is
shot of the genetics possessed by almost
buck in the herd.

at being said, you don't want to elim-
the genetics for large antlers. Some hunt-
ubs or properties and even some states
ntler restrictions to regulate the harvest
cks and have regulations restricting the
st of bucks to 8 points or larger. In
y this sounds good, but it is flawed in
What happens under these regulations
t a large portion of bucks harvested are
ar-old 8-, 9- or 10-pointers, which are
ucks with the best genetics. Under these
ations a 2½-year-old buck can be har-
l but a 5½-year-old 6- or 7-pointer can't be, even though he carries less desirable genetics than the younger buck. Those who use antler point restrictions to regulate buck harvest mean well but end up hurting the trophy potential of the whitetail herd.

If you are interested in harvesting trophy deer, 2½-year-old bucks that sport 8- to 10-point racks are the bucks that should not be taken. In two or three more years those bucks, in all probability, will be true trophy bucks. Antler characteristics are genetic, and certain antler traits can be seen on different properties. On the property I hunt, most bucks have a low, wide look to them, with average-length tines, but some bucks have an entirely different look. A small handful of bucks carry a genetic trait in which they grow an 8-point rack with long G2 points and short (in relation to the G2s) G3s that, combined with the antler tips, have a crab-claw look to them. These are impressive-looking bucks, although the shorter G3s hurt their score some.

Another point to note is that a buck carrying a spike rack shouldn't get an automatic death sentence. Almost all spikes are younger bucks, and if they don't grow into bigger bucks, you can always cull them out when they get older—and at least at that point you will have a nicer set of antlers rather than a spike. Usually a white-tailed deer in North Carolina has to reach at least 3½ years of age to score 120 Boone and Crockett points (and the average North Carolina buck will need to reach 4½ or 5½ years of age). Harvesting bucks by age is the key, because age will take care of genetics better than anything else, including antler point restrictions.

RALPH HENSLEY

In order to have bigger bucks, hunters must accustom themselves to passing on shots at younger bucks with large antlers.

RALPH H

MELISSA McGAW / NCWRC

A lot of readers are probably wondering how they can age a buck in the field. The easiest and simplest way to age a buck while hunting is to look at the body. A 1½- to 2½-year-old buck's rear half will be larger than his shoulders. A 3½-year-old's front and rear sections will be equal in size. After a buck reaches 4½ years old, his front end starts getting bigger than his rear end. His shoulders and neck will be very muscled and thick. His whole body will be thick, even down his back and into his hams. This quick and easy formula will serve you pretty well for aging bucks in the field.

The buck-to-doe ratio and overall deer population are important parts to managing a deer herd for trophy bucks also. The buck-to-doe ratio in a lot of areas in North Carolina is skewed toward more does than bucks, which is a product of harvesting too many bucks. On the property I hunt the ratio is pretty good, but it isn't one-to-one, which is ideal for trophy management. Whitetail fawn birthrate is pretty much one buck to one doe, which should show that is ideal. We do harvest some does every year, and fawn predation mainly from coyotes, and a little from bobcats, helps to keep our deer population in check.

Does, just like bucks, should be harvested by age, taking the older does and leaving the younger ones. Aging a doe is a little different than aging a buck. I find that two charac istics help me age a doe best. One is th overall body size, but this can sometime deceiving. I have seen 6-year-old does w body sizes were smaller than some 3-year does. The one body characteristic that see to hold true is that as a doe ages, she has increased head size. A head that looks pro tionately large, with a big Roman nose, dead giveaway of a mature doe. Around h we call them "old mule-headed does" bec from the side they do favor a mule.

You have to harvest some does, becau section of land can sustain only so many d and having too large a population stresses herd. Unhealthy bucks won't reach the potential antler growth, and malnourish does will be too stressed to produce eno milk for their fawns to have the optimu growth rate. Harvesting does instead of yo bucks is an important part of the manage plan. Harvesting only bucks will never re keep the population in check. A handfu bucks will breed numerous does because does generally will come into estrus ev 28 days until bred. What happens is m fawns are born, then more yearling bucks harvested, and the buck-to-doe ratio bec more skewed.

The great part about this managem plan is that no matter how much money

o invest in deer hunting, this scheme
help you kill bigger bucks. Certainly,
thing you can do to improve habitat will
our hunting. A lot of hunters, however,
have enough spare cash or the equip-
needed to plant food plots, which
se not only the antler size of bucks but
ll herd health as well. But even without
lots, harvesting bucks by age will help
et a shot at a bigger buck.

I pointed out earlier, age naturally
s about larger antlers, so even without
plots or supplemental feeding, after a
ears bucks with increased antler size
d be harvested. I know most hunters
inking that is alright if you own or lease
acres, but that it won't work on 20 acres.
at to the guy not too far from where I
who last year killed, with his bow, on his
re tract, a buck that scored 154 nontyp-
oints. That land has been under trophy
gement for several years, along with the
bors' adjoining tracts. These hunters
a one-buck-a-year limit, period. If you
up and shoot a small buck, there is no
er. You get to sit in your stand and har-
oes while everybody else is hunting for
buck of a lifetime.

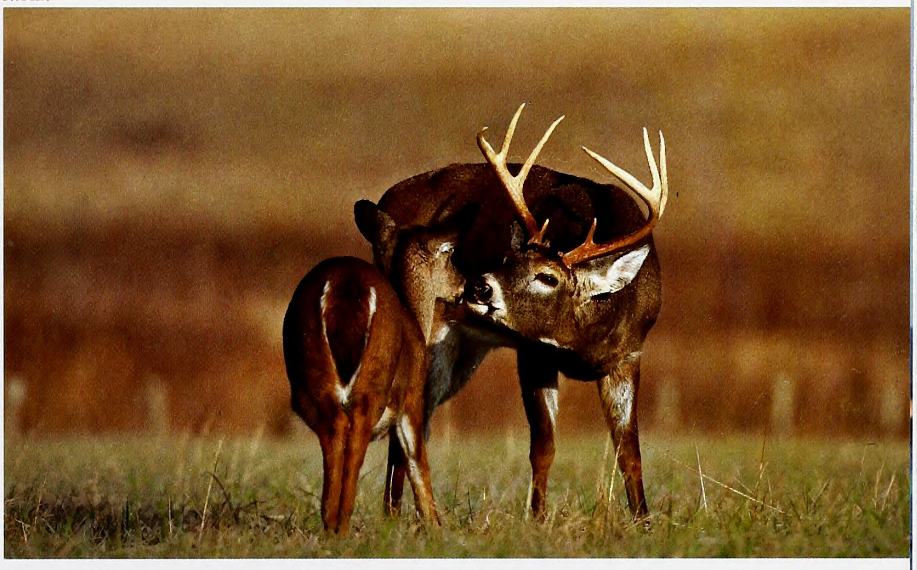
gain, what hunters on small parcels of
have to do is form co-ops. If you get
ner hunters on 10 parcels of land con-
g of 25 to 100 acres each, you then have
o 1,000 acres under trophy manage-
. Start the program and stick with it.
by never harvesting a buck smaller
the biggest buck you have ever taken.
ave to get over the *If I don't kill that little somebody else will* mentality. Some will
led, but some will survive to grow into
r bucks. Eventually, if everything goes
you will have to take a buck smaller
your biggest if you want to take a buck
year.

I'm not going to lie to you, that first 8-pointer you let walk is a slightly traumatic experience. After he walks away, you think, *What have I done? I'll never see him again.* But if you do see him again, it's a better feeling than if you had harvested him earlier. Also nothing helps you stay put in a deer stand like seeing bucks. If you just have to pull the trigger, instead of taking young bucks, harvest a few does. That will help your deer herd in the long run. Wouldn't you rather wrap your hands around the antlers of a buck that is by far bigger than anything you've ever taken? When you do, you'll be glad somebody let him walk when he was young.

Marty Shaffner is a writer and fishing guide who lives in Elkin. He is a frequent contributor to Wildlife in North Carolina.

Habitat improvement and harvesting some does also are key components in having bigger bucks.

BILL LEA

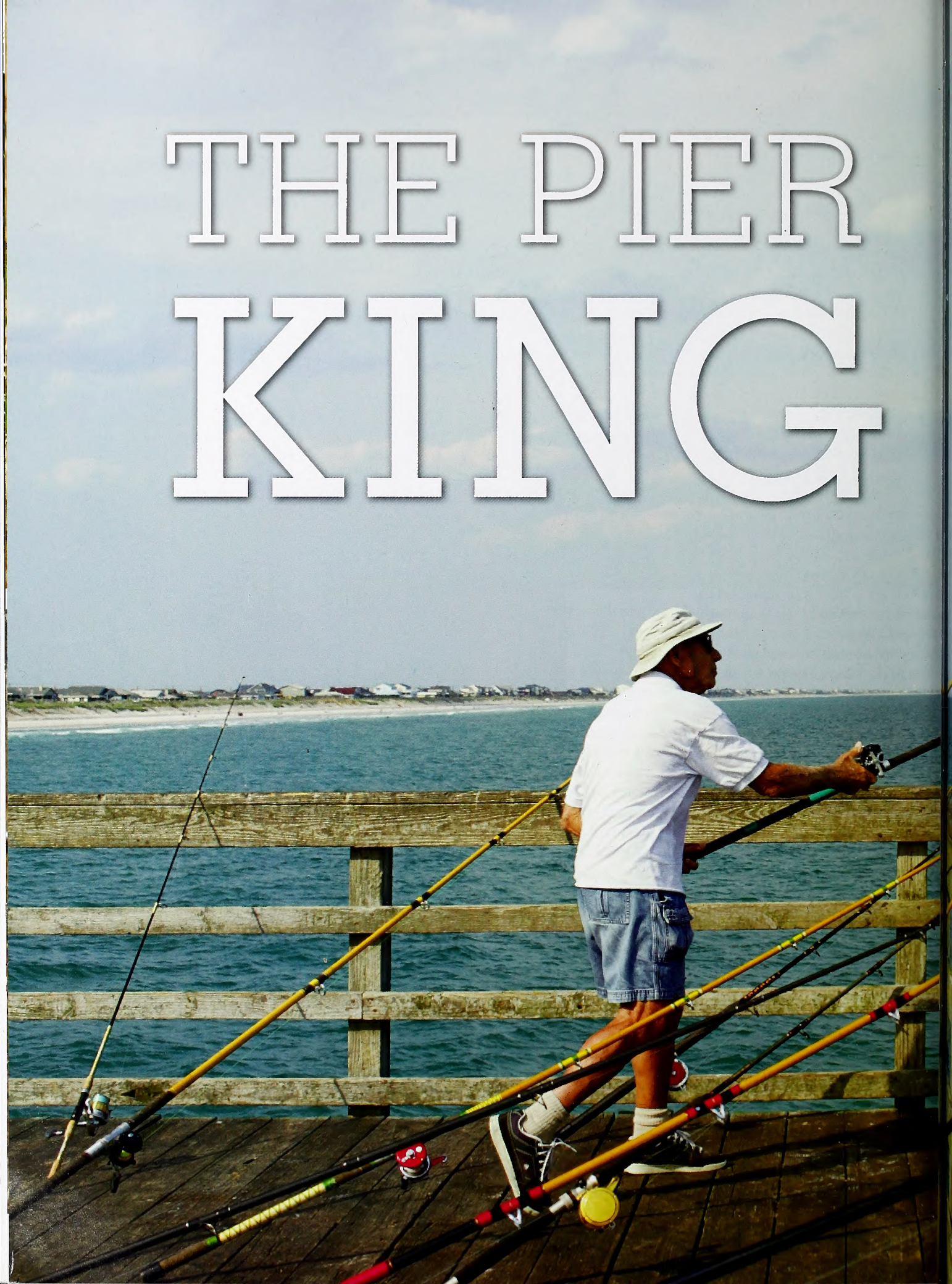


MELISSA McGAW / NCWRC

HAVE TO HARVEST SOME DOES,

because a section of land can sustain only so many deer, and having too large a population stresses the herd.

THE PIER KING

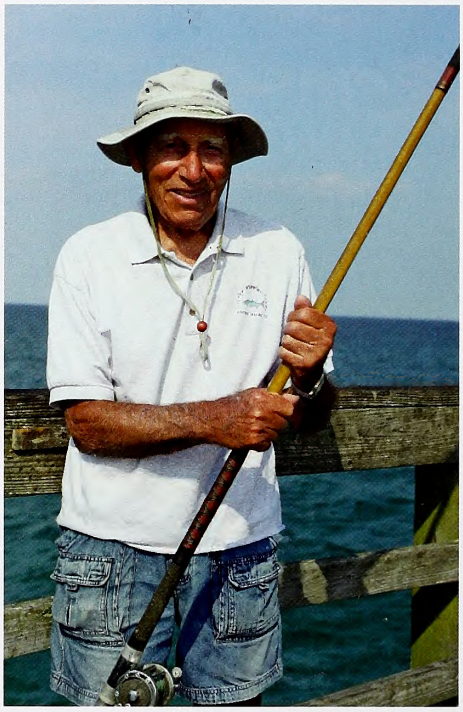


For 56 YEARS, **ANGELO DE PAOLA** has found pleasure in CATCHING **KING MACKEREL**—and lots of them—from the **JOLLY ROGER PIER**.

written by **JACK HORAN** photographed by **MELISSA McGAW**

Anglers who return each spring to fish from the Jolly Roger Pier at Topsail Beach stop in the pier house, buy their fishing permit, load up on bait and then invariably ask pier employees if "Deep" is still around and fishing. The answer is always yes.

At the Jolly Roger, most of the regulars know who Deep is. And they know where to look for him. Mornings and afternoons, on most any day between May and October, he can be found at the end of the pier, wearing a floppy hat and cutoff shorts on warm days, his wiry frame hunched over a weathered gray rail, lines from two rods in the water and an ear cocked to pick up the clicking of his reel over the rolling thunder of the surf and squawk of seagulls.



Deep is Angelo De Paola, a longtim fixture at the pier 20 air miles north of Wilmington. De Paola is a fisherman' fisherman. He has attained near-legend status for his persistence and prowess catching king mackerel as well as oth large fish, from amberjack to tarpon. decades of fishing at the Jolly Roger, h landed an astounding 512 king macke and more than 800 other game fish, plu to 40 sharks and even a sailfish. That do include the countless bluefish, spotted trout and Spanish mackerel lifted from frothy waves into the frying pan or, in r recent years, released alive. And he's s an active angler.

But De Paola holds another remarka achievement—one of longevity. He's b walking the planks of the Jolly Roger ste for 56 years. He started fishing on what then called the New Topsail Ocean Pier 1955, the year after it was built. For th too young to remember, Eisenhower w president then, Alaska and Hawaii were U.S. territories, "Rock Around the Clo by Bill Haley and the Comets was a N song and "The $64,000 Question" was top TV show.

Deep turned 90 last November. He l the strength, endurance and mental ac of a man 30 years his junior. Like other anglers, he tows a pier cart bristling w rods and reels and crammed with rigs a lures to the end of the 850-foot-long p He catches his own baitfish for his kin mackerel rig and puts the baitfish to w in the heavy swells seaward of the pier. exudes a passion for fishing that's conta "I guess I continue to fish because it's s thing I love to do," said De Paola. "It's fresh air, the thrill of having a big fish

Decades ago, he would sometimes n a sleeping bag while spending the night the pier. In recent years, he's trimmed h his pier time by half or more from the p vious 180 days a year, and he no longer f dawn to dusk. "It's hard for me to stand on that pier all day long—I guess age l caught up with me," he noted wryly.

Robby Jordan, a Jolly Roger employ has fished with De Paola since 1972. "T is his second job. He fishes," Jordan s of his friend. "I tell him it's time to go work when he comes through. This is joy. He enjoys being on the end of that fishing. He's dedicated to fishing. That' he wants to do.

ack in the old days, it was daylight
sk, I don't care how cold it was or
vindy it was, we'd stay and fish. And
t a lot of fish too."

Paola didn't grow up, as one might
ct, in the shadow of a fishing pier. He
orn in Italy about 35 miles north of
's in 1920. His father had immigrated
erica for a better life. Angelo and
other couldn't join him for years.
er saw my father until I was 8 years
he said.

nce in America, the De Paola (pro-
ced dee-pay-ola) family settled in
son, N. J., in the New York metropoli-
ea. As a boy, Angelo would break off a
tie a line with a hook on it and fish for
n in local streams. In 1940, he joined
larine Corps, was assigned to Camp
ne and met his wife, Janie, who grew
New Bern. He saw combat in World
I and came back to Camp Lejeune
he war. It was in the Marines where he
d up his nickname, DP, which turned
Deep or Deepy. After his enlistment
p, he got a job as a civilian firefighter
e base.

n his days off, living in Jacksonville,
ola would fish in the surf on nearby
il Island. In 1954, the late Lewis Orr
ilt the New Topsail Ocean Pier. It didn't
long; Hurricane Hazel blew it down
onths later. Orr rebuilt the pier and
ned it in 1955. In that year De Paola
hed from surf to pier fishing because
und it more productive to catch fish
the elevated platform that extended
he ocean.

De Paola said back then fish were superabundant by today's standards, as numerous as whitecaps in a nor'easter. "There was just more fish," he said. "Anytime I went fishing, I caught fish." He remembers seeing huge schools of mullet moving along the shoreline. "You could look up and down the beach; all you could see was black. Nothing but fish. Continuing fish for miles."

In 1975 he ended his career at Camp Lejeune, retiring as fire chief. He relishes recounting the conversation he had with a colleague about his plans for retirement.

"What are you going to do?"

"Go fishing."

"You can't fish every day."

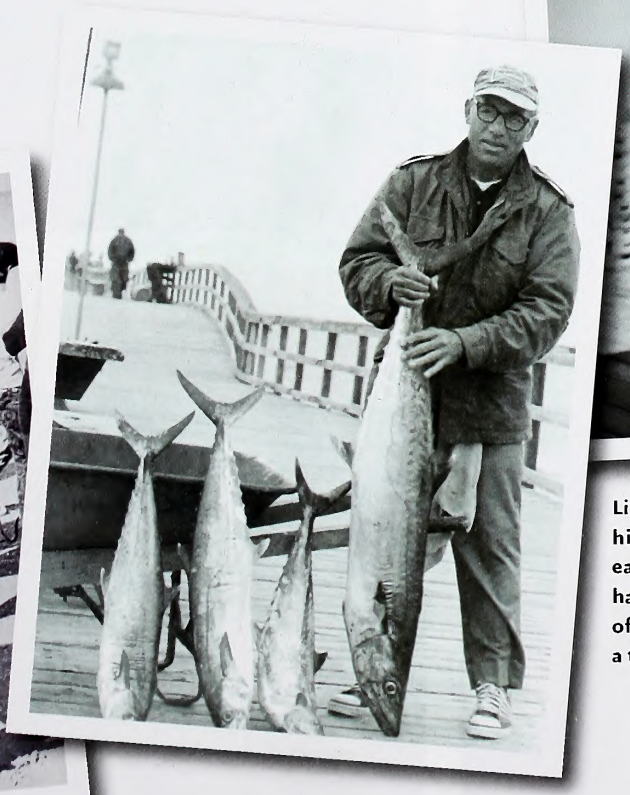
"You watch me."

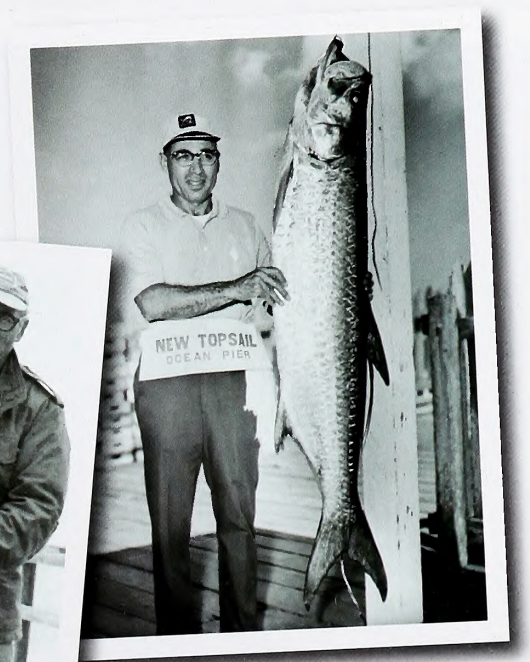
Fish he did, and four years later the De Paolas moved from Jacksonville to Topsail Beach, to a house that's two blocks from the Jolly Roger.

It was 18 years earlier that the king mackerel bug bit De Paola. In 1957 after a charter boat captain told De Paola that he saw kings jumping close to shore. King mackerel are streamlined, toothy wanderers, migrating to the North Carolina coast in spring as the water warms above 68 degrees and often hanging around piers. They feed mainly on menhaden and sardine-like fish. In 2010 recreational anglers in North Carolina caught 35,947 kings averaging about 10 pounds each, according to the Division of Marine Fisheries. The daily limit is three, and minimum length is 24 inches.

The tip that king mackerel could be caught from piers began De Paola's career as North Carolina's premier pier king fisherman. At the Jolly Roger, as well as other ocean piers, anglers station themselves at the T end of the pier. This is De Paola's workplace, an open-air office where the pilings tremble with each passing wave and the view takes in the sparkling Atlantic, fishing boats and passing dolphins.

De Paola uses two fiberglass rods, an "anchor" rod and a "fighting" or "landing" rod. The line on the 10½-foot-long anchor rod is tied to an 8-ounce sand anchor. When thrown 200 to 300 feet, the tines of the anchor dig into the bottom, holding the line in place. Next, he hooks a live baitfish, usually a bluefish, with two treble hooks fastened to a wire leader on a 30-pound test line on the landing rod, also 10½ feet long. A wooden clothespin clips the two lines together, forming what is known as a trolley rig. He lowers the baitfish into the water so





Like many pier anglers, De Paola hauls his fishing cart (opposite) with him each day. Through the years, "Deep" has recorded an impressive variety of fish off the Jolly Roger, including a tarpon (above).

swim freely along the lines, looking
meal fit for a king. When a king mack-
rabs the baitfish and starts to run, the
ıg rod's line pops free from the clothes-
Fish hits. It disconnects. It's real
e," De Paola said.
ith their rods leaning against the rail,
ınglers gather together, talking about
g, the weather, baseball or glory days
eball. All they need to do is listen for
ızz-saw-like clicking of their reels,
ı signals a fish is on. They may wait
, even months for a strike. Boring? Not
De Paola said. "We're always anticipat-
at something's going to happen. You're
's thinking you probably will have a
, should have a strike," he said. Some
ut a bottom rig to catch sea mullet,
or spot to help fill the freezer and
the time away.
1980 the king of the king anglers
ıt four in one hour. In 2007 De Paola
ed a personal milestone by catching
0th king. That year, the North Carolina
ng Pier Society presented him with
-fishing lifetime achievement award.
rd of Fort Mill, S.C., president of the
y, said it's extremely unlikely anyone
g from a North Carolina pier will ever
ach De Paola's current lifetime total of
ings. Unlike boat fishermen, who can
ut king mackerel in multiple locations,
shermen must wait for kings to swim
ir outpost. Baird said for someone to
500-plus kings from a pier today would
difficult to accomplish as it would be
major league pitcher to surpass the
itching wins of baseball's hall of famer
ung. "This is like Cy Young's victories,
Baird said. "No one will ever come
" (The most wins by an active pitcher
, as of June 2011.)
Paola keeps detailed records of the
nackerel he has landed. He said the
er of catches peaked three decades
ıd has declined since. In 2010, Jolly
anglers landed 30 kings, including 11
e day in mid-October. "That day we
t 11, we probably had 20-odd strikes.
in the '70s, we always caught 300 a
n the pier," he said.

la not only catches fish, he dispenses advice and helps novice anglers figure out
ricacies of fishing for king mackerel. As of this past June, De Paola had landed
ressive 512 kings from the pier.

NATURE'S WAYS

Why Do King Mackerel Have Such Sharp Teeth?

See Nature's Ways, page 43.

Of the 30, Deep got five kings. The first came in July, a 13-pounder. He landed the other four during an October king blitz. He got a 26½-pounder on Oct 11, a 17½-pounder and a 20-pounder on Oct 15, and a 24-pounder on Oct 18. His biggest ever weighed 39 pounds.

Kings aren't the only fish that have made De Paola's reel whine. He's caught amberjack, cobia, red drum, a 110-pound tarpon and a 400-pound lemon shark. A night-cruising tiger shark was De Paola's ultimate heavyweight. He latched onto the 11-foot-long shark in 1962 long after most people were asleep. "We fought it all night long. The darn thing was tremendous," he said, forming a circle with his arms nearly the circumference of a tire. "I hooked it about midnight. It was four o'clock in the morning when we got him to the beach. We knew we had a shark, but we didn't know how big it was. We were sure it was over 500 pounds."

The pier had no scales to weigh the Tar Heel Jaws. The monster could have mashed the scales at 1,000 pounds or more. That's because De Paola's shark was just 2 feet shorter than the world record tiger shark, caught two years later off the Cherry Grove Pier in South Carolina. That record shark weighed 1,780 pounds.

His most extraordinary catch came in 1978 when he hooked a sailfish, typically found in the Gulf Stream. De Paola had never seen one before. "I heard the reel take off and saw this sailfish in the air," he related. "He came out of the water and spun in the air. He kept making great leaps." What was a sailfish doing along Topsail Island? De Paola said the same week three were caught a mile off Wrightsville Beach. "Maybe the fish had come in on a warm finger of the Gulf Stream," he theorized. The 7-foot-long, 40-pound, blue-and-green fish hangs from a wall in De Paola's house.

De Paola likes to share his time-tested expertise with others. Friends point to his selflessness in helping novice anglers. "He's always been a part of things here," pier manager Robin Orr said. "A really nice guy. And catches big fish—and plenty of them. He's been a good influence on a lot of people, taking countless kids under his wing to give them tips and such."

Mark Willis of Beulaville took up king mackerel fishing in 2009 under De Paola's tutelage. Though he hasn't caught a king yet, he did land a highly sought-after prize, a tarpon, hot-weather visitors to the coast "Angelo was the first one to help me get my tarpon up here. I've learned a lot out here from him. He's a good guy. It's amazing that he's doing this [at his age]," he said last year.

De Paola's knowledge of fishing and his physical stamina have made him a local legend. Orr related this story that is pure Deep. Several years ago, Orr said, he was talking with a new town police officer when a pier angler hooked a tarpon, walked the fish down the pier to the beach, hopped off the pier and worked the fish in the surf. Sprinting behind the angler was an older man, gaff in hand.

"Who's that guy, what's he doing? And how old is he?" asked the astonished officer as the older man ran behind the angler fighting the tarpon. "Well, that's Angelo," Orr replied, explaining that he was about to gaff the tarpon and pull it onto the sand, "and he's in his mid-80s."

As he approaches 91 in November, De Paola remains an integral part of the Jolly Roger Pier community. He's a widower now; Janie, his wife of 68 years, died in January (the couple had three children, six grandchildren and three great-grandchildren). He still savors the excitement of a strike of a king mackerel, however occasional, and the satisfaction of fighting and landing the fish. "Every day I'm out there, That's what I'm working for," he said. "I just enjoy being out, hearing the reel scream off." ◆

Jack Horan of Charlotte is retired outdoors editor of the Charlotte Observer.

Few reptiles are as popular or well known as our state reptile. Meet the

Turtle in a Box

written by Jeff Beane / illustrations and nature activity by Anne M. Runyon

The Eastern box turtle is North Carolina's only fully terrestrial turtle. It resembles a tortoise, but actually belongs to the large family Emydidae, which includes mostly aquatic and semiaquatic species. North Carolina has no true tortoises, but the box turtle occupies a tortoise's niche. Its thick, domed shell and heavy limbs are adaptations to life on land.

HOME IN A BOX

The box turtle's common name refers to its ability to close its shell. All turtles can withdraw at least partially into their shells, but in most species the bottom part of the shell, called the plastron, is immovable. A box turtle's plastron is hinged, and can completely enclose its head and limbs. Mud and musk turtles also have hinged plastra, but theirs are smaller, offering less protection. Aquatic turtles trade some protection for mobility in water.

The box turtle's scientific name, *Terrapene carolina*, means "Carolina terrapin." Terrapin is derived from a Native American word for turtle. Although box turtles are sometimes called "dry land terrapins," biologists normally use that name only in reference to the diamondback terrapin, which lives in our coastal salt marshes.

SIDE THE BOX

x turtles occur in all North Carolina counties, in a wide variety habitats, but they prefer moist woodlands. Their varied diet cludes insects, worms, slugs and snails, small vertebrates, car-n, fungi (including some mushrooms very toxic to humans) and vide variety of plant material—especially berries and other fruits.

Male box turtles grow slightly larger than females. Males tend to more colorful, and usually have longer, thicker tails, a concave area the lower plastron, thicker, more curved claws on their hind feet, d bright red eyes. A female usually has a flat, proportionally nger plastron, deeper shell, and brown, yellowish or dark red eyes.

Box turtles may mate opportunistically throughout the warmer onths. In spring or early summer, a female uses her hind feet to g a vase-shaped nest, into which she deposits from two to seven sually three or four) oval, leathery-shelled eggs. A female may nest re than once during a season. Eggs hatch in two to three months. me hatchlings emerge in late summer or fall; others remain in e nest until the following spring. The tiny juveniles are secretive d seldom encountered. Their plastral hinges do not develop until ey are 2 or 3 years old; hence hatchling box turtles are often mis-ken for other species. Box turtles mature in about seven to 10 years, d can live for 50 years, or occasionally much longer.

Box turtles overwinter in soft soil beneath surface litter, but they ay occasionally be active on warm winter days. Radiotelemetry udies have taught us much about their home ranges and move-ent patterns. Most individuals have well established territories, nging from less than an acre to well over a hundred acres, depend-g on habitat and available resources.

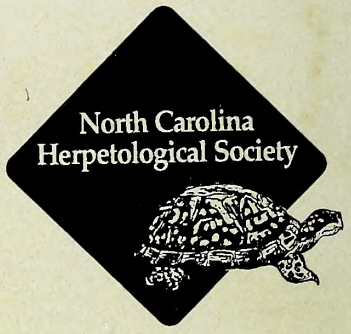
For more information on how you can help box turtles, visit the Box Turtle Collaborative website: sites.google.com/a/uncg.edu/ncboxturtles.

OUTSIDE THE BOX

Turtles have long symbolized perseverance, longevity, continuity and strength. Box turtles are no exception. Four of the 26 states to have thus far adopted state reptiles have selected box turtles. North Carolina adopted the Eastern box turtle as its official state reptile in 1979.

Ancient and highly adaptable, box turtles were once extremely abundant. Human activities have greatly reduced their populations through habitat loss and fragmentation. Turtles walked with dinosaurs, but roads, automobiles, bulldozers, lawnmowers, subdivisions, shopping centers and introduced predators present much greater challenges. The N.C. Wildlife Resources Commission includes the box turtle as a priority species in its Wildlife Action Plan. One goal of the plan is keeping common species common. The box turtle is considered an "umbrella species"—protecting its habitat will result in the protection of many other species.

Tennessee picked the Eastern box turtle as its state reptile, while Missouri claimed the three-toed box turtle (a separate subspecies, *T. c. triunguis*). Kansas chose our other North American species, the ornate box turtle (*T. ornata*). Box turtles are also popular in various logos, including that of the North Carolina Herpetological Society.



Get Outside

Regardless of where you live in North Carolina, you should be able to find box turtles nearby. Unless you are in a highly urbanized area, or on certain portions of the Outer Banks, you may have them in your neighborhood. They aren't always easy to find, but woodland paths, gardens, berry patches and along brush piles are good places to look. Sometimes placing fruit scraps along the edge of a woodlot may attract them. One of the best ways to encounter box turtles is to slowly ride country backroads on warm days, especially after summer rains.

If you find turtles while you are out exploring your surroundings, it may be tempting to keep box turtles as pets, but besides the fact that they have special space and lighting requirements, a pet turtle is a lifetime commitment. They are best enjoyed in the wild, where they belong. Short-term captives should be released back exactly where they were found. Long-term captives should not be released anywhere. Never move box turtles far from where they were found; they have familiar home territories just as you do.

Turtle watching takes time and patience. Should you encounter a box turtle, rather than rushing to pick it up, try watching it from a distance. You may get to see feeding, mating, fighting, nesting or other activities. Never paint box turtles, or carve into their shells to identify them. Take photos instead; individuals can be identified by their unique markings. Make an album of the turtles in your neighborhood. Record where and when you find them, and their behavior. Consult an expert for other noninvasive methods of marking box turtles for study. If you find an injured box turtle, contact a wildlife rehabilitator or the North Carolina State University College of Veterinary Medicine's Turtle Rescue Team (919-982-5923; clubs.ncsu.edu/waazm/turtle_rescue_team.htm). Provide information on exactly where the turtle was found, so it can be returned when recovered.

Read and Find Out

- "Box Turtle at Long Pond" by William T. Geo Greenwillow Books, 1989.
- "North American Box Turtles: A Natural Histo by C. Kenneth Dodd, University of Oklaho Press, 2002.
- "Reptiles of North Carolina" by William M Palmer and Alvin L. Braswell, University North Carolina Press, 1995.
- "The Box Turtle Connection" by Ann Berry Somers and Catherine E. Matthews, 2006, available as a downloadable pdf: www.uncg.e ~absomers/BoxTurtleBook.pdf.

In *Wildlife in North Carolina:*

- "Home is Where the Shell Is" by Jane Rohlir Aug.1988.
- "The Perilous Good Life of the Box Turtle" b Jim Dean, Feb. 1999.
- "A Turtle Bears the Weight of the World" by Elizabeth Hunter, July 2001.
- "Is a Turtle Safe in its Shell?" by Jeff Beane, June 2005.

Find out more about Project WILD Workshop and literature at the Wildlife Commission's we site at www.ncwildlife.org.

The Wildlife Endowment Fund

An Investment for the Future

Established in 1981, the Wildlife Endowment Fund allows the Wildlife Resources Commission to accept tax-deductible contributions for wildlife conservation. Money from the sale of lifetime licenses is also placed in this fund. Your donation or purchase will ensure that North Carolina will have a rich wildlife heritage for generations to come.

Lifetime License Form

Infant and Youth *(check appropriate block)*:

- ☐ Sportsman Infant $200
  (under 1 year old — Application must be received before applicant has attained 1 year of age.)
- ☐ Unified Sportsman/Coastal Recreational Fishing Infant $275
  (under 1 year old — Application must be received before applicant has attained 1 year of age.)
- ☐ Sportsman Youth $350
  (ages 1 through 11 — Application must be received before applicant has attained 12 years of age.)
- ☐ Unified Sportsman/Coastal Recreational Fishing Youth $450
  (ages 1 through 11 — Application must be received before applicant has attained 12 years of age.)

A copy of the birth certificate must accompany applications for infant and youth licenses. Birth certificate documentation cannot be returned.

Note: Pending satisfactory completion of the hunter safety course, persons who possess infant or youth licenses may exercise the privileges thereof when accompanied by an adult who is properly licensed to hunt in North Carolina. "Accompanied" is defined as maintaining a proximity to the hunter which enables the adult to monitor the activities of, and communicate with, the hunter at all times.

Adult (age 12 or older) *(check appropriate block)*:

- ☐ Comprehensive Inland Fishing. $250
  (N.C. residents only — includes basic inland fishing, trout & trout waters on game lands)
- ☐ Comprehensive Hunting. $250
  (N.C. residents only — includes basic hunting, big game, game lands & N.C. waterfowl)
- ☐ Sportsman. $500
  (N.C. residents only age 12 or older — includes basic hunting & inland fishing, big game, game lands, trout & N.C. waterfowl)
- ☐ Coastal Recreational Fishing $250
  (N.C. residents only — includes coastal recreational fishing)
- ☐ Unified Sportsman/Coastal Recreational Fishing $675
  (N.C. residents only — includes same privileges as the Sportsman, plus coastal recreational fishing)

A federal waterfowl stamp must be purchased separately for all N.C. hunting licenses.

Note: On or after July 1, 1991, a person, regardless of age, may not procure a hunting license or hunt in North Carolina without producing a certificate of competency for completing the hunter safety course or a hunting license effective prior to July 1, 1991, or by signing the statement below that he or she had such a license.

Check appropriate block and attach required copy:

- ☐ Copy of Prior Year Hunting License
- ☐ Copy of Hunter Safety Certificate of Competence
- ☐ In lieu of copy, I am signing the statement below:

Statement: I certify that I was a licensed hunter prior to July 1, 1991.

Signature _____ Date _____

Visit us online at www.ncwildlife.org or call 1-888-248-6834 for a complete list of lifetime licenses, including those for nonresidents and 65 and older.

Lifetime License

Complete the following information if applying for a lifetime license. Be sure to check appropriate block(s) on reverse side *(please print legibly)*:

Name of Applicant _____

Daytime Phone _____

Mailing Address _____

Resident Address _____

County _____ Date of Birth _____ Driver License # _____

E-mail Address _____

Is this license a gift? ☐ Yes ☐ No If yes, mail license to ☐ Donor or ☐ Applicant.

License Donor's Name *(if applicable)* _____

Donor's Telephone # _____

Donor's Mailing Address _____

City _____ State _____ Zip _____

Method of Payment: ☐ Check ☐ VISA ☐ MasterCard

Acct. # _____ Expires _____

Print name exactly as it appears on credit card _____

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Personalize your Lifetime License for an additional $5:
Indicate your selection of letters, numbers, dashes, periods, commas and /or blanks up to 6 spaces: ___ ___ ___ ___ ___ ___

Indicate your personal message including letters, numbers, dashes, periods, commas and /or blanks up to 21 spaces:

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Signature of Applicant or Donor _____ Date _____

Note: Only adult lifetime licenses may be purchased by phone or online (VISA or MasterCard only). Call toll-free (1-888-248-6834) or visit us at www.ncwildlife.org. Use this form to purchase infant and youth lifetime licenses by mail.

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☐ I wish to make a tax-deductible contribution to the Wildlife Endowment Fund. Enclosed is my check for $ _____. *(Credit card payments cannat be accepted.)*

Name _____

Daytime Phone _____

Mailing Address _____

City _____ State _____ Zip _____

Make checks payable to: *Wildlife Endowment Fund*

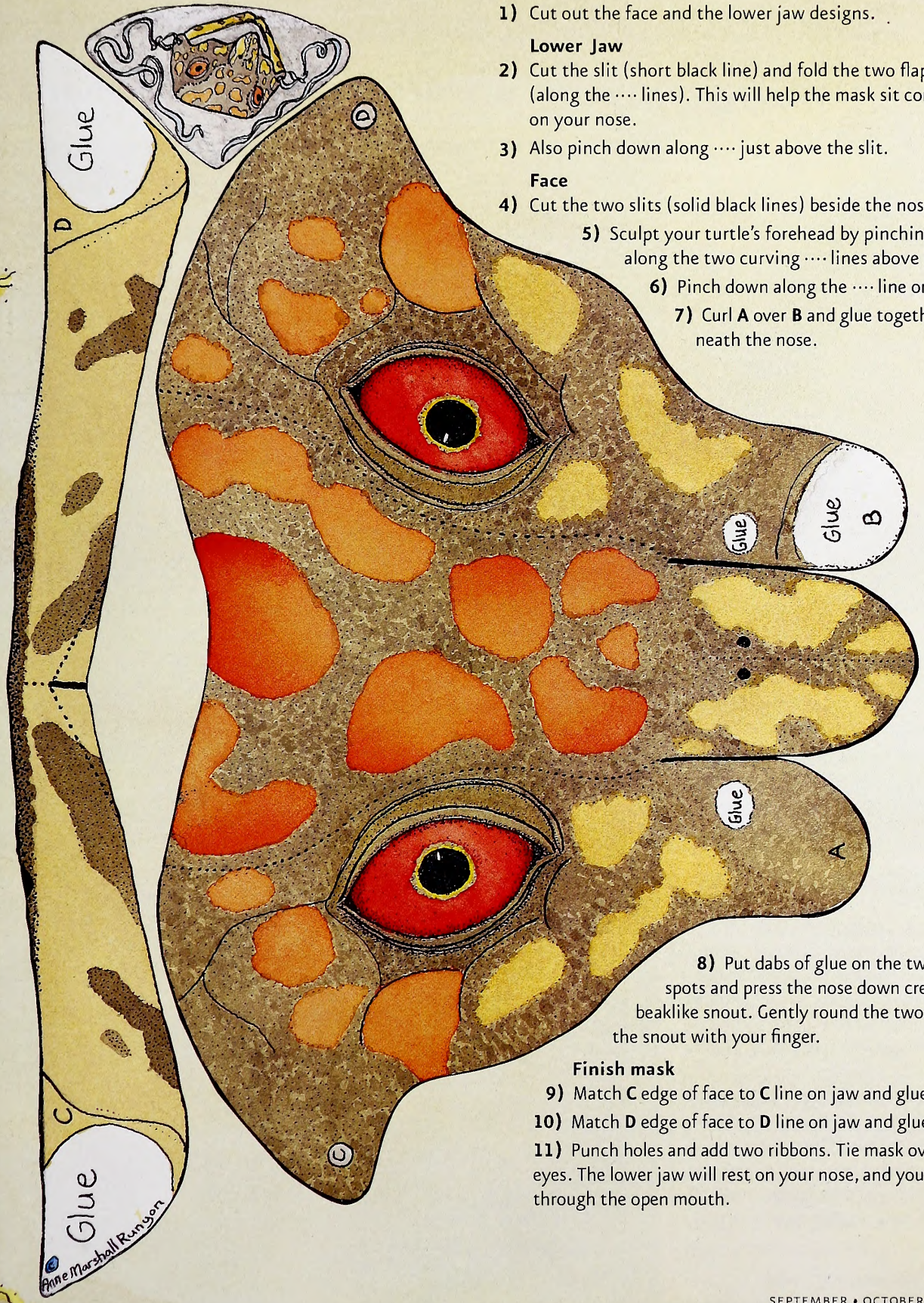
Transactions are not considered final until the check has cleared the bank. Items purchased with a returned check will be made invalid. A service charge of up to $25 will be charged on any returned check. (N.C.G.S. 25-3-506)

Mail completed application and payment to:
NCWRC, License Section, 1707 Mail Service Center, Raleigh, NC 27699-1707

Office location: *NCSU Centennial Campus, 1751 Varsity Drive, Raleigh, N.C. 27606*
Telephone: 1-888-248-6834 (2HUNTFISH)

Make a Box Turtle Mask

(based on an adult male Eastern Box Turtle)



1) Cut out the face and the lower jaw designs.

Lower Jaw

2) Cut the slit (short black line) and fold the two flaps down (along the ···· lines). This will help the mask sit comfortably on your nose.

3) Also pinch down along ···· just above the slit.

Face

4) Cut the two slits (solid black lines) beside the nose.

5) Sculpt your turtle's forehead by pinching down along the two curving ···· lines above his eyes.

6) Pinch down along the ···· line on his nose.

7) Curl **A** over **B** and glue together, underneath the nose.

8) Put dabs of glue on the two glue spots and press the nose down creating a beaklike snout. Gently round the two corners of the snout with your finger.

Finish mask

9) Match **C** edge of face to **C** line on jaw and glue together.

10) Match **D** edge of face to **D** line on jaw and glue together.

11) Punch holes and add two ribbons. Tie mask over your eyes. The lower jaw will rest on your nose, and you can see through the open mouth.

Jumping Monkeys and Ticks

written by Jim Dean

During one of the hotter spells of weather we had earlier this summer, my son Scott and I went to the family farm in Granville County to try to repair a lawnmower that had taken an unauthorized mechanical vacation. It wouldn't start, nor did it have a change of heart after we checked the spark plug, ensured that the battery was charged, inspected the electrical connections and determined that fresh gas was sufficiently present to encourage combustion.

ILLUSTRATION BY JACKIE PITTMAN

That is pretty much the limit of our aptitude and patience in such matters, and especially when it's a toasty 95 at noon and still climbing. More surprising, Curtis King was also stymied despite the fact that he and his wife Louise have worked shade-tree magic with ancient farm equipment around here for more than 50 years.

There was no alternative but to seek professional help, and while Scott and Curtis carried the sullen mower to a repair shop, Louise and I sat on the porch to wait. Even in the shade, the light breeze felt as though it was blowing through a Pittsburgh steel mill.

"I've always thought it was a bit nippy anytime the temperature dropped below 80."

"Look at those fields and woods," I said, marveling at the brassy shimmering haze.

"Yep, monkeys jumping," said Louise. "I've heard that all my life to describe what we're seeing."

When Scott and Curtis drove up 30 minutes later without the mower, the first thing Scott said was "Curtis says monkeys are jumping." Long have Scott and I lived in the South, born and bred here, yet neither of us had ever heard of any jumping monkeys. But like a lot of old South colloquialisms, it fits.

Certainly, there have been some miserably torrid summers and some devastating years of drought since I took over management of the farm from my father 30-some years ago, but is it just my imagination that Mother Nature is cranking up the thermostat, or is it simply because age is sapping my energy? After all, I've always thought it was a bit nippy anytime the temperature dropped below 80.

I probably ought to know better than to pick this scab, but the majority of experts say global warming is real, and that we're going to see increasing effects even if a few hot summers or cold winters don't necessarily prove anything right now. They are careful to point out that they analyze a vast and varied amount of data worldwide over a very long period of time rather than focus on shorter cycles that might be normal fluctuations. But if they are right about all the accumulating evidence—and I fear they are—even a small rise in global temperature will at some point have many significant impacts. If we think monkeys are jumping now, chances are we ain't seen nothing yet.

Regardless of what anyone personally believes about this subject and its predicted effects, we don't need an expert to tell us when it's a scorcher. Shucks, I can even predict them months in advance.

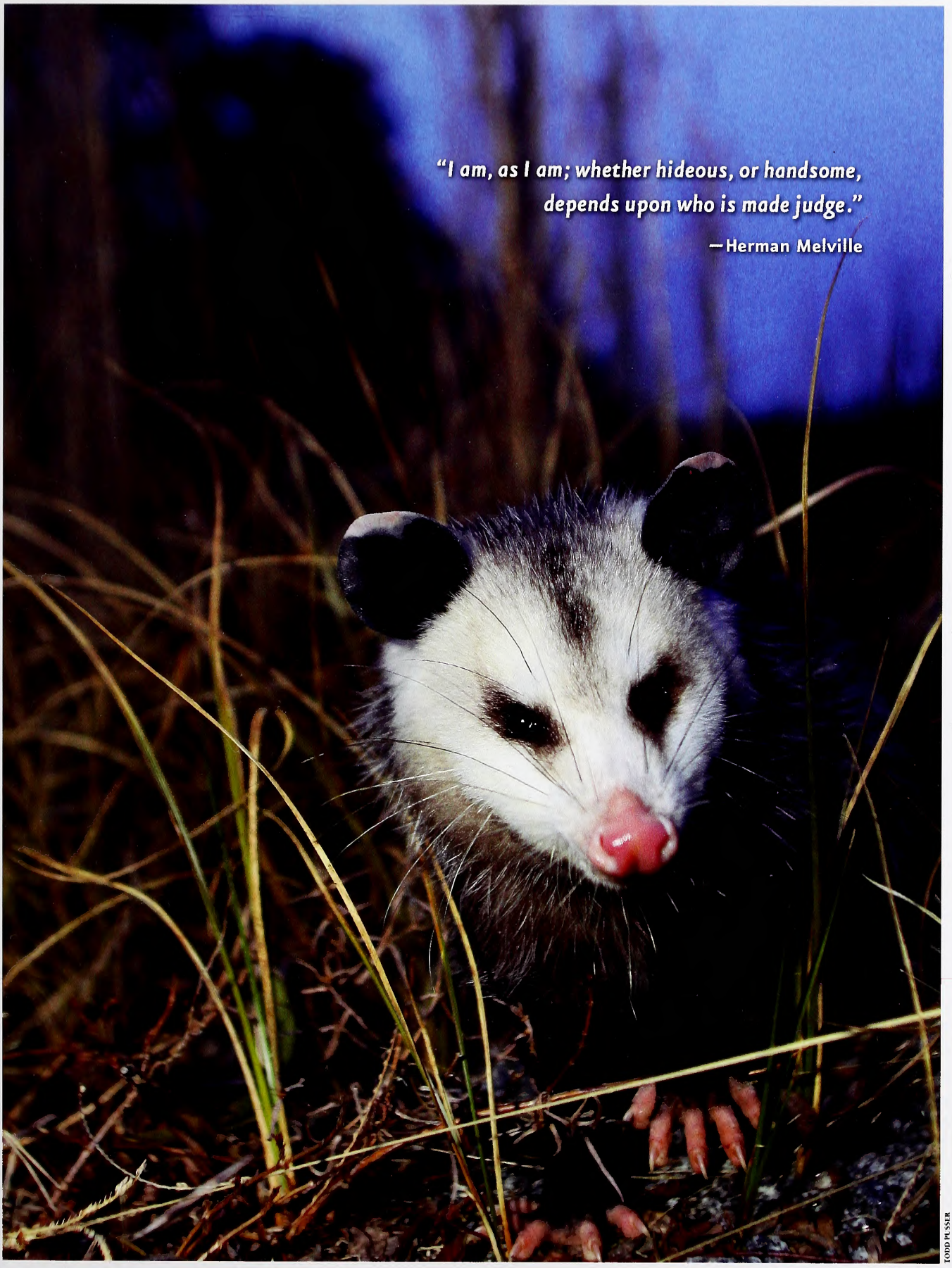
As I write this in the middle of an unseasonable June heat wave, I can promise you that the opening day (and most likely the entire first week) of the dove season in September is going to be a hot as a well-digger's . . . no, wait, wrong metaphor. It will be as hot as the hammered-down hinges of Hades. But if the corn and sunflowers have been cut, the doves will be flying, and we will be out there.

Here's another prediction. The only way I will ever bag a legal limit of doves with a box of shells is if that limit is dropped to three or four birds, which is roughly my average.

And when I claim my spot in the field slathered in sunscreen, I can be assured that I will be immediately transformed into a tick and chigger magnet. The problem isn't a big tick that you can pick off—you can usually feel them crawling. We're talking about those vast pigmy hordes of itty-bitty seed ticks that seem to be so much more common nowadays. These little guys are not much bigger than a pinhead, and fast. And sneaky. They often attack in platoons—it's not as easy to feel 'em crawling—and they know precisely where they want to go, which is the very place we least want them to go.

Clyde Sorenson, professor of entomology at NC State, says these little ticks are actually the larvae and nymphs of the Lone Star tick, and he believes their increased numbers are likely tied to expanding deer herds, and possibly even a moderating climate. Even if ticks didn't carry serious diseases, their bites itch for weeks.

Just wondering, but while we're waiting for rising sea levels to reach Kinston, could we maybe spare a couple of experts to figure out what do to about these tiny ticks? And while they're at it, they might want to find out whether there's any risk posed by a population explosion of jumping monkeys.



TODD PLSEK

Opossum

OUTDOOR MOMENT

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SEP - 6 2011

IN THE NOVEMBER · DECEMBER ISSUE

TODD PUSSER

BIRD DIVERSITY

North Carolina is home to many species of birds, some common, some rare. Here's a look at a few of them.

FIRST IN FORESTRY

A grandson discovers relics of his grandfather's days at Biltmore, the nation's first school of forestry.

NO DOG, NO WORRY

Just because you don't have the chance to hunt grouse over a dog, doesn't mean you can't pursue these birds.

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WILDLIFE IN NORTH CAROLINA

NORTH CAROLINA Wildlife RESOURCES COMMISSION

45
75/9

75th ANNIVERSARY ISSUE
Since 1937

Author David Lee found a kinship with many of the writings from his grandfather's journals of 100 years ago from the Biltmore Forest School.

PHOTOGRAPH BY MELISSA McGAW/NCWRC.

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Volume 75 | Number 9

WILDLIFE IN NORTH CAROLINA

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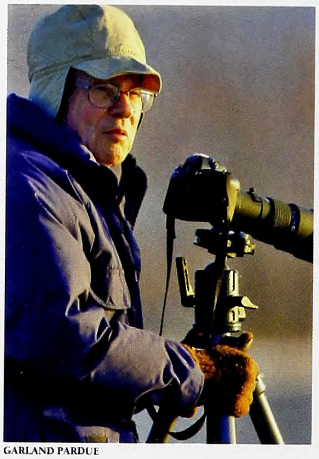
Cover: The northern bobwhite (*Colinus virginianus*) for many years has been the preeminent game bird of North Carolina. This female is a pen-raised bird. PHOTOGRAPH BY TODD PUSSER.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

Last summer I had the pleasure of attending a party for longtime *Wildlife in North Carolina* contributor Gene Hester, who was celebrating his 80th birthday. Hester, one of the kindest, most affable men you're likely to meet, would have had a passel of friends had the occasion been his 30th birthday. As it was, a very large room was nearly overflowing with family and friends.


GARLAND PARDUE

Also in attendance was Jack Dermid, a man who has the longest association of anyone with *Wildlife in North Carolina* and its predecessors. Dermid, now 86, began writing for *North Carolina Wildlife Conservation* in 1943. In August 1944, Corporal Jack Dermid wrote a touching piece about American soldiers fishing in Normandy while cannon fire thundered in the distance.

Of one soldier, Dermid wrote: "In his hand was a battered rod. It is probably one of the most cherished of his few personal possessions. To carry it during his distant travels was work and worry, but this soldier knew the rewards would be great."

It was a small scene following the greatest invasion in the history of warfare. And yet Dermid finds something important there. It is a gift, a turn of mind that allows him to illustrate larger points from something many of us would think as insignificant.

Of course, Dermid is most well known as a photographer, not a writer. From 1948 to 1962, he served as *WINC*'s staff photographer, associate editor and managing editor. For years his wonderful black and white images graced the inside front cover of the magazine. In this issue, one of his black and whites appears on the inside back cover.

As a photographer, Dermid often explored nature up close. He loves to photograph patterns in nature, whether it's tree bark or foam on the Sewanee River. He finds meaning there, and he allows us to find it by looking at his photographs.

After leaving the magazine, Dermid taught biology at UNC Wilmington, but never lost his enthusiasm for photography or for friends or for life. Jack is not as active as he once was, but he told his pal Gene that recently he had taken his camera out in the yard to photograph toadstools. "It sure felt good to hear the shutter click," he said.

For those of us who know Jack, even if only through his photos, we would agree. Jack helps bind us to the past, strengthen us in the present, and give us hope for the future.

Jim Wilson

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WILDLIFE IN NORTH CAROLINA

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ssue of Memories

been receiving *Wildlife in North Carolina* -plus years, but the July–August 2011 really struck a memory nerve for me. The e, "The New Jennette's Pier," sent me back ne to 1968 through 1972 when I worked est summer job a young man could have. there when Mr. Jennette — we affec- tely called him "The Old Man" — owned er and Warren Jennette Jr. was my boss. e from all over the country and the world to Jennette's to pursue their fishing es, and the crew was there to help — Captain Andy, Easy, Dorsey, Bob rother), Ralph, Edy, T. Nixon, Tom and lon, Frisco, Squeak, Injun, Milton, Bill lim. I don't think I left anyone out during eriod. The "regulars" became family and oked forward to their summer migration nnette's. Warren Jr. was a fantastic boss, ut firm. The Old Man was a "little firmer." w they would be proud to know that n Carolina has a pier for all the people ng their name.

ien go to page 32 and the article on the Legends." There stands Bo Cash, a true fishing gentleman. He may not remem- ut I met Bo just above the bridge at the Mountain Campground on the Upper n Toe River. Bo was very complimentary fly-fishing ability and gave me a fly he ght might catch those "bread-fed" trout the bridge. I still have that fly today and was some 25-plus years ago. I stopped at Bo's shop, and he outfitted my G-Loomis rod with a buckskin fly line and all the trimmings ready for the next year. I have caught many a brook, rainbow and brown on that rod since that time.

Thanks for the memories, *Wildlife in North Carolina*. Keep those great articles coming. Spend time with kids outdoors.

Richard Thornton
Fremont

Fishing and Families

I can't tell you how much I enjoyed Bruce Ingram's article ("The Fascination Began at Five") in the September–October issue. I am 54 years old, and the memories he stirred up in me were unbelievable. I am sure my parents also knew that I was sneaking away to the creek behind Grove Park Baptist Church in Clinton when I was 9 or 10 years old. I spent hours catching minnows, putting them under a bobber and catching bream and small bass and an occasional catfish. I am so thankful for those days, even though my mother truly believed that the police would show up at her house to advise her that I had drowned or had died from snake bite.

I passed on the love of fishing to my boys, and after playing in all our local creeks growing up they are better and more avid fishermen today than I am. I am so glad I have this bond with my boys today, and that they were fishing rather than playing video games all day long. Recently, our son relocated to Greensboro and he invited me to go fishing on the Yadkin up above Winston-Salem near East Bend. Although the water was a little muddy we did catch a few smallmouths and now I am hooked. Keep up the good work!

John Elmore
Greenville

Thanks for the Consideration

I noticed that some readers were concerned that our subscription had been cut in half, as far as the number of issues we would receive (as in expecting 36 and receiving 18). I, too, was disappointed to know that I was not going to receive your state-of-the-art magazine each month.

However, I noticed in my September–October edition that you had extended my subscription from 2014 to 2017. I think that this is an overly fine gesture on your part, and I am sure that it was a costly move for you in this bad economy. However, thank you very much for your consideration to those of us who renewed before your notification of the cut back. Personally I would have renewed regardless. I feel sure that there are many magazines that would not have made that thoughtful gesture.

Steve Sink
Linwood

Delayed Implication

My enjoyment of Jim Dean's otherwise excellent article ("Delayed Harvest Delights" in the September–October issue) was ruined by his unwarranted insult to our state [government] and, by implication (so common in today's nasty political environment) our federal government: "Perhaps the only odd thing about this is the realization that there is a government-sponsored program that apparently has nearly universal and enthusiastic acceptance. This is as rare as going fishing and knowing that you're almost sure to catch something." Cheers.

Norm Kowal
Black Mountain

We Want Your Feedback

Do you have a comment about content in *Wildlife in North Carolina?* Questions about something you read or have seen? Send us an e-mail at letters@ncwildlife.org. If you want fellow readers to know your opinion, this is the place. If you want an expert to answer your question, we will do our best to help. We hope to hear from you!

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No Dog, NO PROBLEM

As rewarding as grouse hunting over a dog might be, a lone hunter can find success without man's best friend.

written by
Gerald Almy

The woods were still and brittle cold as I eased cautiously along the thick, tangled mountainside. While my feet searched for sure footing on the steep slope, my eyes scanned ahead, analyzing the terrain for good grouse cover. A large blowdown caught my eye, and I instinctively veered toward it.

Greenbriers grew nearby, and the fallen tree was swaddled in grapevines. It seemed like a perfect location to find a grouse hunkered down with both food and cover in one spot. Easing up to the fallen tree, I felt my fingers tighten their grip around the smooth, dark stock of the 16-gauge side-by-side my father had hunted grouse with 30 years before.

When I came within 10 yards of the cover, I paused, holding the double at my chest. Suddenly the silence of the winter woods was shattered by the thundering wings of a grouse flushing from the edge of the fallen tree. Swinging the barrels on the bird's flight path, I slapped the front trigger, and the large cock grouse fell to the ground as a puff of russet feathers drifted softly onto the forest floor.

It was a sweet but unusual sensation to connect on the first shot of the day. Usually there are several spent shells tucked away in my game pouch before I add a ruffed grouse to it. But today, luck was with me.

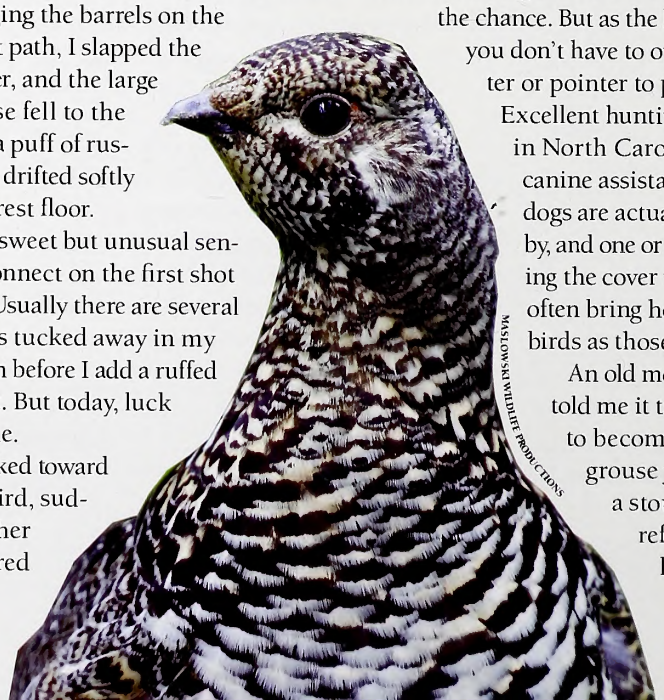
As I walked toward the fallen bird, suddenly another grouse soared from the cover, banked hard and glided down the mountainside. I tried a quick snap shot but missed cleanly.

There was little cause for disappointment, though. The day was a good one for grouse hunting with light winds, low cloud cover and cool temperatures. By the time my legs cried out for relief from the day's hunt, I had flushed four more grouse, seeing two of them and bagging one.

It was definitely an above-average day when I trudged up the trail to the truck, unloaded my bounty and headed home. Delicious dining lay ahead, when the birds would be roasted to a golden brown essence with a dab of butter, a few simple spices and a splash of chardonnay.

Grouse hunting with bird dogs is an immensely rewarding sport, and anytime I get an opportunity to accompany someone who owns a good mountain dog, I jump at the chance. But as the hunt above shows, you don't have to own a Brittany, setter or pointer to pursue grouse. Excellent hunting can be enjoyed in North Carolina without canine assistance. Good grouse dogs are actually hard to come by, and one or two hunters working the cover without a dog will often bring home just as many birds as those with one.

An old mountain man once told me it takes three things to become a successful grouse jump shooter: a stout heart, quick reflexes and strong legs. The heart



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be in good shape to take the excite-
of a grouse thundering out of the
at your feet like a rocket when you
expect it. The reflexes must be quick to
p from this startling event, mount the
nd fire at a target arcing between trees
natter of seconds. Finally, the legs must
ong to spend hour after hour combing
nickly tangled woods and hiking the
mountain ridges that North Carolina
e call home.

ose qualities are definitely a plus. But
lso must know a bit about the habitat
e prefer, how to work the cover sys-
ically and how to flush the birds that
ere in the best way possible to get a
shot.

u can narrow the search for grouse in
ate by eliminating roughly the eastern
hirds from consideration. Some grouse
und in the western fringes of the Pied-
, but by far the most birds are in the
ntainous part of the state. Public lands
oundant in the Nantahala and Pisgah
nal forests. Good bets include the Stand-
dian section of the Nantahala Game
s in Macon County and the Flat Top
on of Pisgah Game Lands in Yancey
nty. Abandoned farms in the foothills
lso be good.

ry little gear is required for jump-shoot-
rouse, compared to, say, going after
-tailed deer, wild turkey or especially
fowl. But having the right equipment
al, starting with the proper shotgun.
gauge from 12 to 28 will work, and I've
d with a few experts who used a .410.
ne hunter with average wing-shooting
, a 12, 16 or 20 is best.

CHIP LAUGHTON

CHIP LAUGHTON

MASLOWSKI WILDLIFE PRODUCTIONS

Although many hunters use semi-automatics, pumps or over-and-unders for grouse hunting, the classic gun is a side-by-side, usually in 12-, 16- or 20-gauge. Because grouse frequently are found in thick cover, often hunters prefer shotguns with shorter barrels.

MASLOWSKI WILDLIFE PRODUCTIONS

CHIP LAUGHTON

Since most shots come at ranges of 30 yards, an open (skeet) choke, or at n an improved cylinder, is best. If you hav double and find you're getting some lon shots, as often happens later in the seaso improved cylinder/modified combinati a good choice. Over-and-unders, side-sides, autoloaders, pumps and single sh are all acceptable, though you'll miss sc opportunities for a follow-up chance w the single shot.

Whatever action and gauge you sel the gun should be lightweight and hav fairly short barrel. A heavy, long-barre gun doesn't allow the quick, instincti shooting needed for these speedy bird Longer barrels are also harder to maneu in the brushy, congested cover, catching brush or grapevines just as you're tryin swing on a swiftly departing bird.

Shot sizes 6 to 8 can be used for grou I prefer 8s for the early season and 7½s winter hunts. Try several loads and see w patterns work best in your gun before m ing the final decision. Experiment on p targets with both different brands and s sizes at ranges from 15 to 35 yards.

Clothing should be loose fitting and fortable. I favor a vest over a coat, for fr dom of movement and to make sweati less likely on hard climbs. You can car extra shells, water bottle and lunch stas in the pockets of the game pouch and s have room for a grouse or two. In winte though, you may prefer a canvas coat. M sure the coat or vest has some blaze ora on it, so other hunters can see you. Ad hat with a brim to shield your eyes from sun and block rain and snow, plus shoo glasses if you don't wear eyeglasses. We rugged double-faced brush pants to pro your legs from briars and thorns. Huntin boots should be well broken in before th season, and wearing two pairs of socks light polypropylene topped with a woo pair—protects the feet from blisters.

Now you're ready to hit the woods. B doing so, however, consult with the loc enforcement officer, a regional biologis hunting supply store to get some leads good spots to try. Once you have a gene area pinpointed, then you can focus on f ing the specific cover where grouse wil likely be holding in that tract.

Two things will determine where gro are: food and cover. Food is vital for

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shment, cover for security from pred-
ınd protection from the elements. Early
year, ridges can be good because trees
ave some leaves that provide cover, and
is available. Later in the year, the birds
move lower down to middle-elevation
and even hollows, draws and stream
ms. Also check out pine thickets and
with honeysuckle and greenbrier. The
of overgrown, abandoned farms are
times good spots, too.
leaves fall from trees, jump shooting
nes more productive because there are
places for the grouse to find cover,
hey are more concentrated. Look for
in thick, brushy, tangled areas with
l, rhododendron, greenbrier, grape-
and blackberry.
ɔnifer thickets are especially good in
y weather or wet, stormy conditions.
check these spots out late in the day,
the birds like to roost there at night.
ver areas that have been timbered a few
earlier and are growing back with lots
v brush, berries, tender leaves and forbs
lso favored.
s much as anything, grouse jump
ters seem to go by feel when searching
rds. If you can't identify all of the types
ored foods and vegetation grouse prefer,
t worry. After a few experiences in the
ds, you'll soon develop an intuition for
makes good grouse cover and be able
entify it instinctively.
ı short, look for thick, tangled-looking
r with downfalls, second-growth timber,
's and brush—areas that you often have
ght your way through.
ow it's time to map out a plan for how
ɔproach and work the area. The best
egy might be to make a long, oval walk
ugh the cover, or a back-and-forth zig-
ɔattern paralleling various levels of a
ntain or hillside. Your goal should be to
r the maximum amount of the habitat
the least duplication of effort, by avoid-
going over the same area twice. It's also
ɔrtant to conserve energy by doing more
ways walking along the slopes and less
ınd-down travel, which is particularly
l on the legs.
ometimes you can probe one edge of a
spine, then cross over and walk back
ıe truck on the opposite side. Or you
trek up one side of a hollow, then cross
and hike down the other side.

How Can Grouse Flush So Fast?

See Nature's Ways, page 43.

Pace yourself so you don't wear out too quickly, and punctuate the walk with lots of pauses. These rest your body, but more important, they flush grouse. When you move steadily through the woods, grouse might not be particularly alarmed and simply hunker down and allow you to walk past without flushing, relying on their camouflaged woods colors to protect themselves.

If you pause for 10 to 30 seconds, however, these same birds feel threatened. They sense they've been detected by a predator and must flee to escape. The result: You get a shot opportunity you wouldn't otherwise have had. You'll also have your feet firmly planted and be ready for the thundering flush.

As you walk, examine the cover ahead. This helps you plan your pauses to take place when you're near a likely bit of cover where a bird could be hiding and where you'll be able to swing the gun freely without a branch or grapevine snagging it.

If you're hunting with a partner, try mixing up the pauses. Have one hunter stop one time, the other hunter the next, and then both hunters together. Keep visual contact with your partner when possible. Wearing blaze orange helps.

Jump shooting requires quick gun handling, aiming and firing. That's why a fairly light gun with that short barrel is best. There's no time for dallying. Hesitate for a split second and the bird will vanish behind a wall of thick cover. Keep the gun at port arms as much as possible, with the safety on. The second you hear or see a bird getting up, raise the gun to your shoulder and prepare for the shot. If you can't see the bird or if it's too far away, you can always pull back.

Always be alert for a second or third grouse flushing. They don't hang in coveys like quail, but sometimes you'll jump two or three in a group. Also watch the direction birds fly. If they go only 75 to 150 yards, you can try to flush them again.

Marking where the birds you hit go down is extremely important without a dog to help retrieve them. I try to focus exactly on the spot where the bird fell and keep my eyes there until I pick up a prominent landmark, then walk directly to it. If a second grouse gets up before I've marked where the first one fell, I don't try for it, concentrating instead on pinpointing the first one. If a grouse flushes after I mark the first one, then I may try for it and repeat the marking procedure.

If you're not sure whether your shot connected, always go to the last spot where you saw the bird and search anyway. You'll be surprised how many times you'll find the grouse just beyond where you could last see it.

Of course, most times when a grouse flushes, either there won't be a chance for a shot or, if you're like me, you'll simply miss. But just the contact with the birds and the joy of the flush are rewards in themselves. And every now and then our shots connect. When they do, the prize is a great game bird that seems to symbolize the wild spirit of the rugged mountains.

No one has ever been able to raise grouse in pens like pheasant and quail for artificial stocking. That's just fine as far as most grouse hunters are concerned. No one can take the wildness out of this bird. When we are fortunate to bag one, we've probably put in five to six hours of mountain walking and feel like we've made a little of that bird's wild home a part of ourselves.

And though it would be foolish ever to pass up an invitation to hunt behind a crackerjack English pointer, setter or Brittany, if you don't own a grouse dog and don't get asked along on such a hunt, don't despair. Instead, put on some good hiking boots and brush pants; grab a lightweight, open-choked shotgun; and spend the day tromping North Carolina's grouse mountains. It would be hard to think of a better way to spend a crisp fall or winter afternoon. ◆

Gerald Almy has been writing full-time about hunting and fishing for 33 years and is a contributing editor to Field & Stream *and field editor for* Sports Afield.

Plant Taxonomy
A Short History of Botany in the United States
Seven Twenty Four

A remembrance of the nation's first forestry school through the souvenirs of a grandfather

BILTMORE: *First in Forestry*

In the early 1900s, states were still being admitted to the union, and the motorcar and typewriter had just been introduced to the American public. In the previous century, timber operations had slashed their way through forests with the simple policy of "cut and get out." To farmers, trees were obstacles to plows. The popular writings of Aldo Leopold describing the concepts of forest stewardship and the organization of natural communities would not appear for another four decades.

WRITTEN BY *David S. Lee* PHOTOGRAPHED BY *Melissa McGaw*

Julian Weatherbee was my grandfather on my mother's side of the family, and when he died in the mid-1970s, I inherited his old rolltop desk. The desk had been handcrafted to his specifications when he was a forester in the state of Washington. It was well built, and the western oak withstood both the escapades of grandchildren and moves from Spokane to New Hampshire to Baltimore to Raleigh. To my surprise, on arrival, it still held its original contents. I examined the sundry objects as I sorted them into appropriate drawers. The upper roll-up work space was to become mine, the compartments to stash unanswered letters, unpaid bills, envelopes and checkbooks, with the small drawers for pencils, pens, paper clips, stamps, rubber bands and all the other things that are accustomed to living in desks.

The top of the desk, above the roll-up compartment, became a display area for various memorabilia from three, perhaps four, family generations, mostly old photos, interesting hand-me-down artifacts and an old brass lamp from God knows where. The six larger drawers in the lower half of the desk would remain the domain of my grandfather's clutter, providing space for his World War II ration books; several well-smoked pipes; family genealogy charts; protractors, slide rules and compasses; pens that you actually filled from inkwells; a number of black-and-white photographs; degree and award certificates; and class notes from when he attended forestry school in western North Carolina. Noticeably lacking was anything that was photocopied or made from plastic. I felt a little guilty when I drilled a hole through the back for my laptop cables, but it is a solid piece of furniture, and what is one little hole? Geez!

One of the items I discovered amongst his piles of papers was a printed copy of his school's standards for admission. The Biltmore Forest School, the first forestry school in the nation, was open to men who were high school graduates in good standing and at least 20 years of age. High school studies had to include "algebra to quadratic equations, the first five books of plane geometry, and plane trigonometry." It was recommended that applicants have at least three months' experience in lumbering or in the government service prior to en ing. There was a probationary period, a enrollment was limited to 25 students.

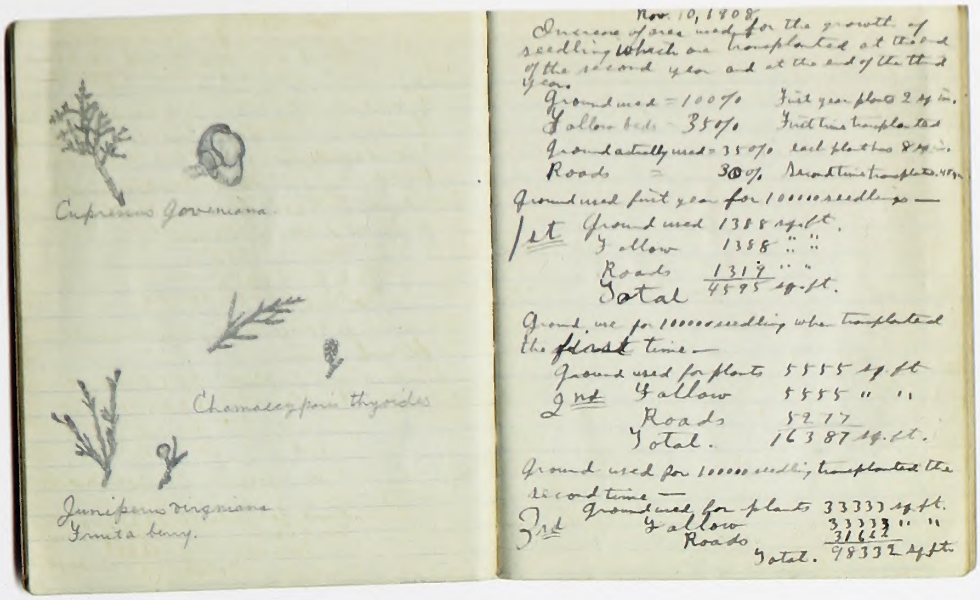
The admission fees were of interest particularly in light of today's costs: tui $200, room and board $330, incidenta (including railway fare, clothing, club d and study excursions) $200, books $20, and feeding of a horse $160. Yes, a horse each student was required to have a ho The cost of the horse ($100 to $150) was included, because students leaving usua sold the animals to incoming students f what they had cost originally. Thus, the t cost, minus the horse rental, was $1,00 1908, the year my grandfather enrolled.

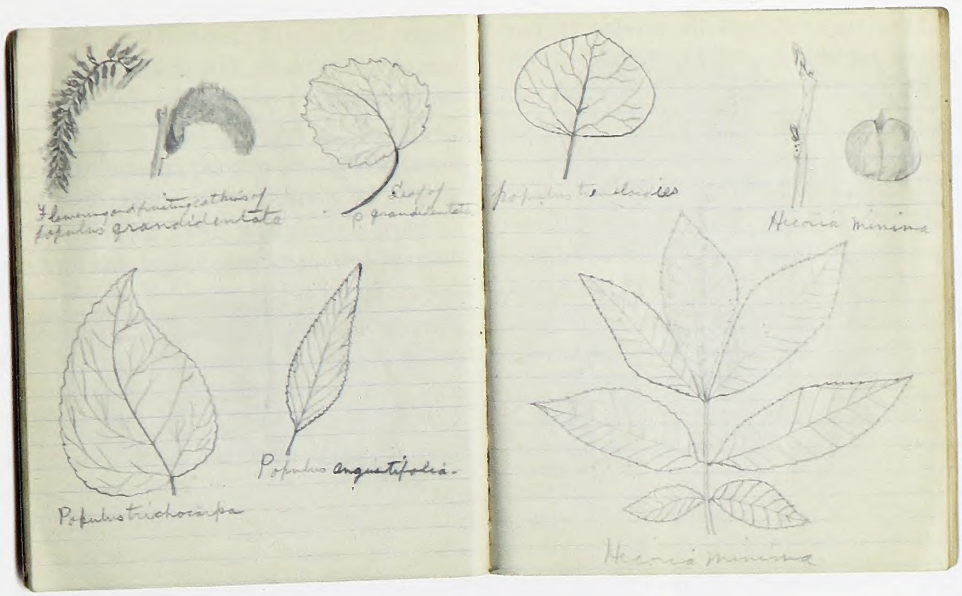
Although I had the desk and its cont in my possession for more than 30 years was only recently that I decided it was tim read through my grandfather's handwri class notes. A hundred years seemed a adequate time for the contents to have p erly aged. There were four bound noteb —two from class lectures and what appe to be class assignments, and two for fiel notes. I could immediately see from the notes that the lessons were advanced f their time. For example, the notebooks c tained explanations of the principles o ecological succession, a topic that was n described formally until 1916.

In addition the books contained my grandfather's detailed sketches of nati trees: not just the leaves and twigs but a enlarged likenesses of the seedpods an sometimes of the individual seeds. Wh quickly caught my eye were four illust tions of winter twigs of poplars and on willow. The twigs, of course, had no leav in November, and my grandfather's pen sketches carefully illustrated each speci distinct placement of buds. I laughed. T was both ironic and haunting. Was this t ghost of classrooms past? My first gradu level botany class opened on a cold nigh when we went outside on our professor's f and learned to identify several dozen woo plants by their bud placement. I could ac ally identify these trees in the drawings. W I the victim of an ongoing educational pl handed down through the generations fr my grandfather's schooling?

Besides the actual forestry lessons, th notebooks contained information about v ious wildlife encountered on field excursio There were lists of birds seen at specific si with comments about their behavior. He and there were remnants of plant specime

had been taped to the pages, and
:hes and names of wildflowers that my
ıdfather came across. It was a hodge-
ge of information, but as I read on, col-
vely it became a good overview of the
ın's natural history.
Vith even a quick skimming of the con-
s, I could understand the need for the
h prerequisites. Pages were filled with
ıulae and geometric drawings illustra-
theoretical solutions to the problem of
sporting timber down steep mountain
lients. Then there were the field pro-
ns. "Weight of the locomotive is 35 tons,
le 4 percent, frictional resistance on
:es 2 percent. How many board feet of
ılock can be pulled up hill if the weight
ıe cars is 4 tons each?" I will skip the
braic calculations, because I don't actu-
understand them, but the answer was
)6 tons. (I guess you just somehow knew
many board feet that would be.) There
e also notations for determining the
)unts of wood that could be hauled by
ed oxen.
The pages also contained descriptions
trip transects through various woodlots
:re the students were apparently required
lentify and count all the trees, calculate
number of logs for each type of wood
then come up with the total number of
rd feet of lumber and its value. Between
pages were folded pieces of graph paper
which students had mapped tree stands
l, by pacing, determined their exact areas
vn to the hundredth of an acre.
There were lessons in projecting the cost
:etting a cord of wood to market (60 cents
cutting a cord of firewood, $1.50 for haul-
it to the Biltmore mill, $1.50 for sawing
l delivery to Asheville and a $5.85 selling
:e in Asheville: profit $2.25). And much
:ntion was paid to detail: "Monday April,
1909. The buds of *Magnolia fraseri* are
v opening. As each bud scale comes off it
:es a scar around the twig. The first two or
scales from the outside are not attached
he leaves, but all of the inner ones are."
)m what I was reading, it appeared that
combination of course expectations and
d experience was much more demanding
n in today's college curriculum.
The information appeared in no logical
quence. One paragraph would describe
illing operation, and the next sentence
uld be about the horse running off. But
: scattered information could be pieced
gether and drawn into the historical





Among the treasures the author found tucked away inside an antique desk for more than 30 years were his grandfather's class and field notebooks filled with sketches of plants. The notebooks also contained information about birds and other wildlife, providing an overview of the region's natural history.

context. "Dr. S showed us the last plantation he had made with chestnut. It is a failure and Dr. S said that chestnut will always be a failure until it is of enough value so that more money can be spent on its cultivation." At the time of the Forest School, chestnut trees were cut primarily for the production of tannin used by the local hide industry. The Biltmore estate, in addition to 1,000 cords of bark, was under contract to harvest 1,500 cords of chestnut a year to sell to the fur market for tanning pelts. This was prior to the disappearance of the American chestnut from the landscape. The chestnut blight, first observed at the Bronx Zoo in 1904, took 40 years to spread through the total range of the tree, killing off one of the major components of our middle-latitude deciduous forest.

The forestry class really traveled. Heaven knows the actual number of frequent-saddle miles they accumulated, but the students made trips throughout the southern Appalachians, some as far as northern Georgia to visit various examples of experimental forestry plots and natural forests at different elevations. I found the notebooks filled with place-names and descriptions of exact sites the class visited. Many were ones I had visited 80 years later while doing breeding bird surveys in the North Carolina mountains. This was a little eerie. There were other places I wondered about. Where exactly did the "lower" ferry cross the French Broad? And this implies there was also an upper one. Then there was the large pilot snake [black rat snake] found on July 16, 1909 at Pink Beds, a site the school moved to between May and November. My grandfather used most of a page to describe its defensive behavior. Was this snake a relative of one I found there in the early 1990s? Humans are not the only beings with a heritage.

Among the desk's secrets were a number of pamphlets and similar publications about the school and its classes. Looking through the school's curriculum, I was impressed with the course of study: silviculture, forest mensuration, forest surveying, forest working plans, lumbering and technology, forest finance, forest production, forest policy, forest work of the federal government, forest planting in the prairie states, physiological anatomy of plants, general morphology and classification of plants, wood structure, identification of woods, classification and distribution of the forest trees of the United States, field identification of trees, herbarium of woody plants, fungus diseases of trees, preservation of timber, forest entomology, forest zoology, propagation of game and fish, forest geology, elementary climatology, forest geography, elementary law and economics.

Most of these were three- and four-week courses, but many were longer, and for each one the students were given individual grades. There were visiting instructors, too, most well-known naturalists and foresters of their time. They came from the U.S. Biological Survey, the Bureau of Entomology, the New York Botanical Garden and the U.S. Forest Service. Professors from various universities and representatives of commercial timber companies also assisted with the instruction. The curriculum was far ahead of its time. The basics of ecology had not yet been thought out, but here was a series of mini-courses that tied together not only what drove the forest ecosystem system but also the associated economic considerations regarding the production and harvest of timber and the planning and public policy necessary for long-term forest management.

This all began in 1895 when George W. Vanderbilt brought Dr. Carl A. Schenck from Germany to manage the vast forested lands of his North Carolina Biltmore estate. The 30-year-old Schenck replaced Gifford Pinchot as the estate's forester. Pinchot was another pioneer of modern-day forestry techniques who after three years at Biltmore went on to become the first chief forester for the U.S. Department of Agriculture. Schenck immediately began introducing new sound and practical forest management techniques at Biltmore. Over tim Schenck realized he was constantly expl ing to his workers and others in the co munity what he was doing and how hi methods would result in long-term heal forests. This eventually evolved into an site forestry education program.

With Vanderbilt's blessings, the Biltm Forest School was opened in 1898, becom the first school of its kind in the New W It was a good deal all around. At the tir the Vanderbilt estate comprised 200 squ miles of mostly forested lands that need attention. Because of its extremes in el vation, the tract, which today is mostly national forest, supported a variety of ty of southern Appalachian forests and was ideal study site. The school itself consist of little more than several of the estate abandoned farm buildings, but it offered intensive one-year course of study. The component was hands-on work in all asp of forestry, supplemented by classroom l tures in modern silvicultural theory. The cept was learning-while-doing practical fo management, in which the students appl what they had learned in the classroom.

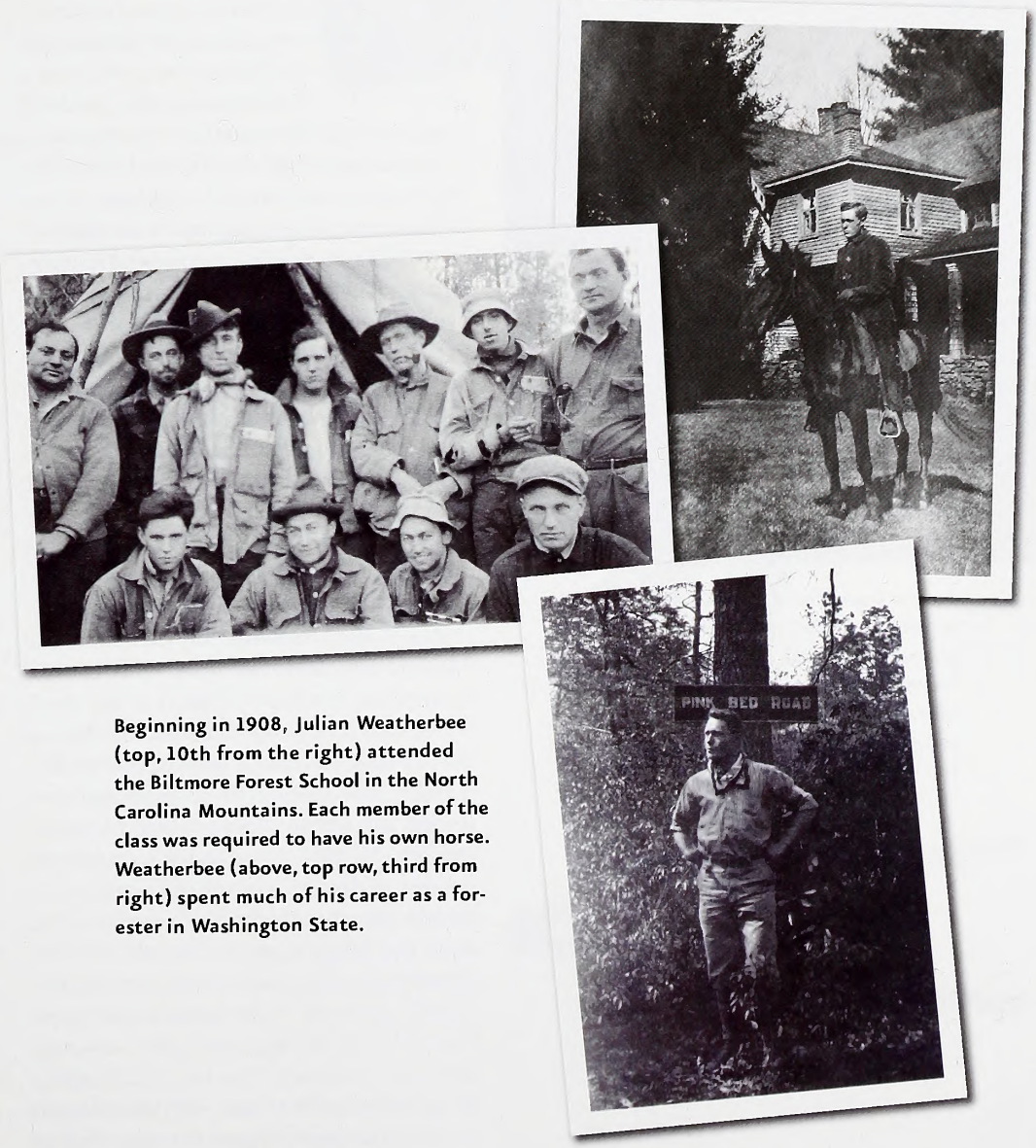
A 1908 booklet prepared for prospect students states: "[A] forest school cann make a fully fledged forester: it can onl lay the foundation and point the way o Mastership in any profession comes on after long experience in practical work. is as true in the woods as it is in the hospi or in the railroad shop that a man of mer theoretical training is utterly useless."

This statement seems to sum up rathe well Schenck's philosophy on educatio

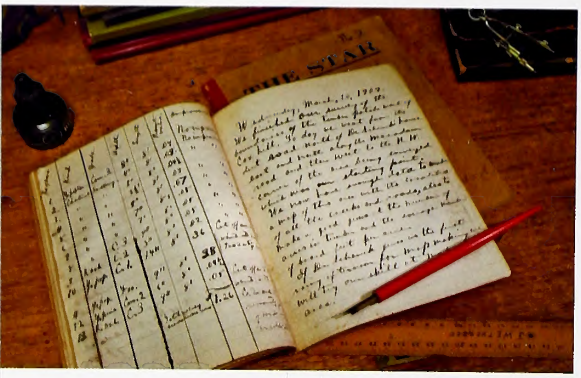
students learned not by watching but oing. One of the class assignments was ng out an additional 10 to 12 miles of ging roads through the Biltmore estate n year. To drive home the expected work c, the booklet advised the would-be stu- ts that, in addition to their eight-hour s, they were expected to prepare their n meals, care for their horses and look r their own bedding. As part of their ning, Schenck wanted each student to erience the life of a forester. The stu- ts learned, and Vanderbilt's lands were perly managed.

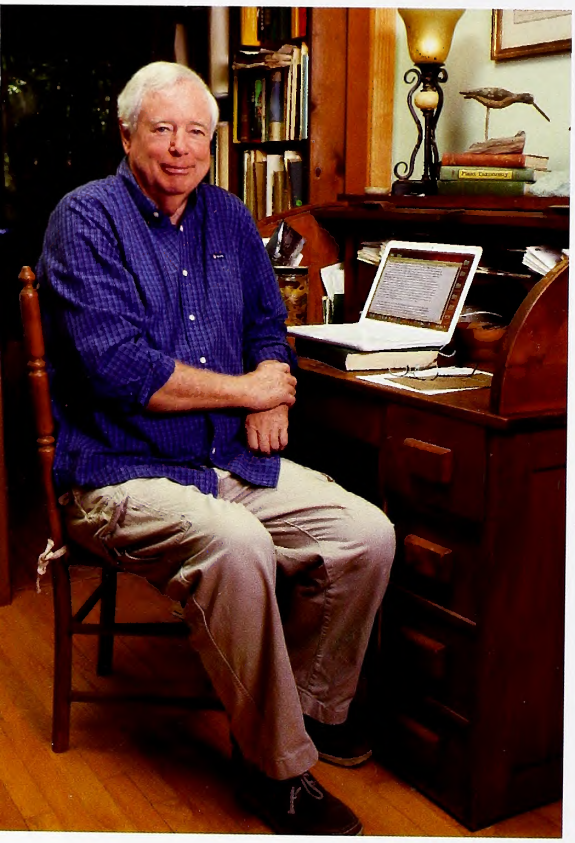
As a professor Dr. Schenck was a demand- but highly respected teacher, and as his dents took to their studies, they recog- ed the importance of his innovative ideas ut forestry. He followed the progress of h student closely. In my grandfather's ebooks, many of the pages had been ded, and Schenck did not fail to boldly ke through and clarify notations that e not exactly correct. Often his comments, ich appeared now and again over my ndfather's notes, were simple, brief and ightforward, such as "NO!" Because re were no forestry textbooks available his students to use as reference material, enck had a number of his lectures on st policy and forest protection published 904, followed by another series five years r. I found copies of these among my grand- ner's belongings, their margins filled h penciled notes.

From my grandfather's notebooks, it pears that he started at the school at age in early October 1908. In November of



Beginning in 1908, Julian Weatherbee (top, 10th from the right) attended the Biltmore Forest School in the North Carolina Mountains. Each member of the class was required to have his own horse. Weatherbee (above, top row, third from right) spent much of his career as a forester in Washington State.





Author David Lee sits at his grandfather's desk that held class and field journals, plus some of the tools of the forester's trade (opposite page). Lee now uses the desk in his own work, some of which has shown a decided kinship with that of his grandfather.

that year the school hosted the Biltmore Forest Fair. The students all helped in presenting the school's accomplishments and the needs for practical and scientific forest management to visitors. The notebooks recorded that in the days prior to the event the students spent all their time labeling trees. The three-day festival celebrated the 10th anniversary of the opening of Schenck and Vanderbilt's school.

The event exhibited to the public the new concepts of forestry that were being taught, as the visitors took tours of the various forest plantations on the Biltmore estate. Dr. Schenck in typical form was the guide, giving detailed information on soil composition, seed regeneration, planting techniques and innovative logging operations. The fair clearly demonstrated the actual results of the new forestry practices to the region's lumbermen, foresters, furniture manufacturers and even professional botanists and university professors. Newspapers picked up on the event, and their articles and editorials publicized the importance of the school's contributions.

Photographs found in the desk showed the forestry students and their horses in bare landscapes, treeless mountain ridges denuded by decades of commercial lumbering operations. The American frontier had pushed through the region about 1790, and in the century that followed the land had been largely logged, with erosion becoming a major problem. Once the steam engine came into wide use in the late 1800s, commercial logging at high elevations increased, with the most destructive cutting of the region's forests occurring not much later, during World War I.

By 1909 Schenck and Vanderbilt had several major disagreements, the school at Biltmore was closed and Schenck returned to Germany. He took a number of his students, including my grandfather, back to Europe with him. In the desk were two additional notebooks from my grandfather's studies in Germany between Oct. 24, 1910, and Feb. 21, 1911. My grandfather's apprenticeship under Dr. Schenck in Germany explains the origin of the Black Forest cuckoo clock that hangs in silent disrepair over the rolltop desk. Schenck's school continued to operate, primarily in the famed Black Forest, through 1913. During its 15-year existence, the school graduated more than 350 students. My grandfather returned to the United States and later became a forester for a large Indian reservation in Spokane, Wash. He worked there for a number of years as one of the [illegible] rangers for the newly formed Department [illegible] the Interior's Office of Indian Affairs.

Prior to the completion of his term [illegible] office, President Teddy Roosevelt had k[illegible] started the conservation movement wit[illegible] creation of national parks. Although at [illegible] time all the country's national forests a[illegible] parks were in the Western states, they al[illegible] comprised over 147 million acres of pub[illegible] lands, lands needing men to oversee the[illegible] stewardship with modern forestry progr[illegible] In its relatively brief history, the Forest Sc[illegible] provided the foundation for both forestr[illegible] education and modern-day forestry pra[illegible] tices. The school's graduates made up t[illegible] first generation of professional America[illegible] foresters. The teachings of sustainable forestry at Biltmore have continued to in[illegible] ence forestry practices on both private a[illegible] public lands.

Since the Biltmore days, schools of fore[illegible] have sprung up all over the nation. Prem[illegible] schools such as those at N.C. State and D[illegible] universities are widely recognized for pr[illegible] ducing state-of-the-art foresters. The a[illegible] demic forestry curriculums of these an[illegible] other universities at first were largely mo[illegible] eled around the successful program ini[illegible] ated by Schenck.

In the late 1800s and early 1900s, th[illegible] assets of our forests and their manageme[illegible] needs began to come into focus as civil s[illegible] vants in Raleigh overseeing the state's ec[illegible] omy looked for ways to promote North [illegible] Carolina. Large slabs of wood of comm[illegible] cially important trees from the Appalachi[illegible] and other parts of the state formed a maj[illegible] component of a traveling exhibit that ma[illegible] its way to various international expositio[illegible] and fairs. The large cross sections from 1[illegible] native trees collected by foresters Gifford Pinchot and W.W. Ashe showed off the co[illegible] mercial potential of the state's forests. Th[illegible] exhibit was sent from Raleigh to Chicag[illegible] Paris, St. Louis and other prominent citi[illegible] and attracted companies interested in lar[illegible] scale furniture production to the state.

When not traveling for display, the exh[illegible] it's rock, mineral and wood specimens became the focal pieces for exhibits at th[illegible] newly founded State Museum of Natura[illegible] History. State geologist W.C. Kerr, who w[illegible] responsible for first assembling the displa[illegible] wrote: "The people of the state have bee[illegible] accustomed to regard and to treat the fore[illegible] as natural enemy, to be extirpated . . . by a[illegible] means with any cost." With the coming [illegible]

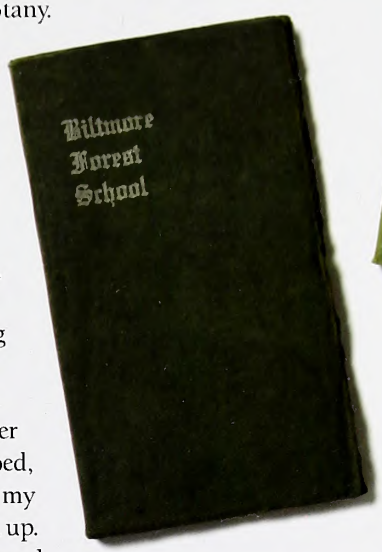
new science of forestry, "all that has been nged." The exhibits offered people a new reciation of North Carolina's natural urces. The need for the Forest School been recognized just prior to Schenck's val at Biltmore, and the state's promo- al campaign was in progress as the cago and Paris world's fairs both took e during his tenure.

Even though this story goes back only two erations, it is hard to imagine the world ne early 1900s. Pioneering naturalists n as Asa Gray and John James Audubon recorded their major discoveries in the thern Appalachians only a half-century or to the founding of the Forest School. fundamentals of game management in th America had yet to be understood, but eets of this, too, can be seen in Schenck's hing. It was a period when our early nat- lists were still exploring the mountains' ets, when brooks full of salamanders and odland shrews and other small mammals awaited discovery.

I was aware, even from a young age, of grandfather's knowledge of forests and r composition. Often when we were driv- about, he would interrupt my grand- her's constant babbling to name the trees forest or to estimate the number of board of lumber in an isolated grove of pines. was the only one in the family who took nterest in the sundry collections of toads, kes and turtles that I kept in the base- nt, and one weekend he helped me build outdoor cage for my pet skunk.

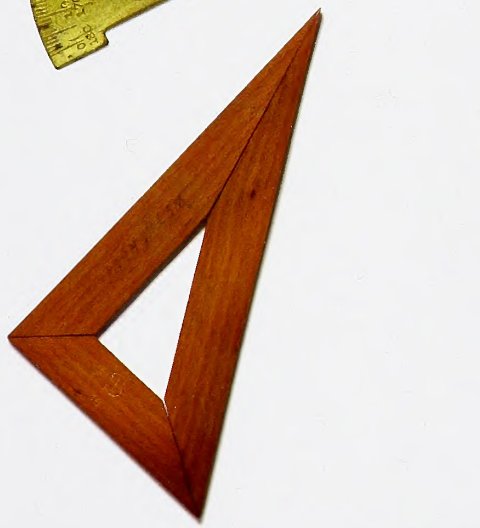
Because of this, I was not surprised when grandfather took considerable interest in freshman college botany course. I came ne for spring break to find that my grand- ents were visiting. He studied my botany t with considerable attention. A day or ater, when I mentioned that we were all ected to collect, mount and name 50 native nts as part of the course, he was eager to p. At the time I was unaware that he had n through the same drill 54 years earlier. With his help, by that weekend I had iden- ed and collected 150 different plants. Even ugh it was mid-April, I waited until the l of the semester to turn them in. A little ra credit always helps, or so I thought. The fessor graded the assignment by sub- cting points for anything that was wrong. spelled scientific names and names for nt families, capital letters in the wrong ce, and species my professor did not real- were native were each worth a minus one. My end grade was okay, but it would have been far better if I had limited myself to just 50 common plants. (I see from his papers that my grandfather got 100 on his plant herbarium.)

I ended the semester by learning something in addition to botany. It was probably a good lesson, as it identified a grading method I clearly did not want to duplicate when I later began my teaching career. And ever since that course, I have seen no point in ever doing anything ahead of time.



I recall an incident one summer when, after I had just been put to bed, my grandfather was in my room telling me to get up. We were visiting my grandparents, and I was probably only 5 years old; I still have no idea what time it was, but the summer sun stays up late in New Hampshire. I was taken to the backyard garden and shown a wood turtle as she laid her eggs. I watched for close to an hour. The turtle carefully covered up her completed nest and, in the dimming light, headed off into the woods. I retain few memories from that early age, but this is one that stuck. To this day I am not clear whether that was a life-defining moment or whether my grandfather had simply figured out that I had a predisposition to my lifelong interest. Either way, somehow Schenck's teachings were passed on.

Much to the disappointment of my father, like my grandfather—who must have equally disappointed his parents—I chose not to enter the business world. My grandfather walked away from a lucrative Ohio-based business, the first chain of five-and-dime stores in the nation. His grandfather had done the same, turning his interest to whaling. Though it was a totally different course, I suspect that the genetics taught to me in college actually holds true. My cousin was lucky; he got just my grandfather's curly hair and was able to have a successful career designing airplanes. I still find myself outdoors watching bugs and lizards. ◆



Regular contributor David S. Lee is director of the Tortoise Reserve, an international turtle conservation organization.

The afternoon was exceptionally quiet, with the truck traffic's rolling-wheel roll call along a nearby thoroughfare subsiding and a close-by quarry's clanking and clashing shut down for the weekend. It was the perfect Sunday for a deer hunt.

I had climbed into a tree stand on my family's land, as I had many times before that December day last year. Though I had taken several deer during the season, Christmas was drawing nigh. As has become a tradition, I wanted a couple of venison hindquarters to smoke for the family's holiday gathering.

I had allowed a couple of deer within crossbow range to walk away earlier in the season, along with a dozen that were too far away to risk shooting a bolt. With my archery-only and muzzleloader-archery seasons preempted by a severe flood that inundated the entire property in September and October, I was wishing I had not waited so long to take a North Carolina deer with a crossbow.

In my hands was a cocked Horton Vision reverse-draw crossbow, a state-of-the-art hunting implement with a draw weight of 175 pounds that was mounted with a telescopic sight that had five crosshairs for pinpoint elevation accuracy out to 50 yards. The scope even had interior lighting with a choice of red or green illumination for perfect aiming in low-light conditions. A razor-sharp Thunder Head point on the arrow promised lethality if I did my part.

When an acorn popped beneath a hoof, it was like thunder in my ears. I moved only my eyes until I spotted a button buck slipping through the oaks. When the deer was less than 20 yards away, I raised the crossbow and aligned the scope.

The hunt was the culmination of a couple of lifelong quests. The first was hunting with a crossbow, and the second was hunting on Sunday. Both had been prohibited activities for the duration of most North Carolinians' lifetimes. Only federal military bases could allow Sunday hunting, and only those hunters with disabilities could obtain permission to use a crossbow.

My fascination with crossbows began when I was a child. Enthralled by anything that launched a projectile, I received a toy crossbow when I was 6 or 7 years old. The string was cotton twine, similar to kite string, and the bow was made of a black-and-brown plastic that looked almost purple. It shot arrows with suction cup tips at a paper target. Although the bow broke after a couple hundred shots, it was much more accurate than other toy bows that I received for gifts before consumer protection agencies decided such toys were too dangerous.

When I was 16, my family lived in Climax, in the caretaker's home on the grounds of a hunting lodge built by famous financier J. P. Morgan. In the garage, the stock of a .22 rifle hung on a nail in the rafters. I filled the barrel channel with wood filler and fashioned a trigger mechanism from a gate hinge and a nail. I made a bow from a fiberglass rod that had been used for the flag on a golf course green and used twisted polyester twine to make a string. Drilling a hole in the front of the stock, I inserted the bow, which was held in place with a sleeve of heavy plastic automotive hose and setscrews.

The crossbow was extremely accurate and had a draw weight I estimated at 35 pounds. I shot targets and gigged frogs, before discovering that using a crossbow to hunt any critter in North Carolina was illegal.

Having only Saturdays for hunting was disheartening for a boy surrounded by thousands of acres of prime hunting land. As I matured, hunting became more than passion, more than hobby, until I earned my livelihood as a freelance hunting and fishing writer. My work took me to many states where I could hunt on Sunday, but, alas, that was not the case in my own state.

That changed in 2010 when, after some intense debates over wildlife regulations, the N.C. Wildlife Resources Commission began to allow the use of crossbows and hunting on Sunday on private lands. Crossbows, though allowed for hunting, still required a pistol permit before they could be purchased, a law that had been passed by the legislature in the 1980s as the result of a single crossbow murder.

I was reminded of childhood days spent watching the Robin Hood series on black-and-white television. Robin Hood's band of Merry Men (the good guys) had bows and arrows, but the sheriff of Nottingham's gang (the bad guys) was armed with crossbows that had supernatural accuracy at ranges a modern rifle cannot achieve.

After becoming an avid bowhunter, and in some years taking my entire limit of deer in North Carolina with a recurve bow, I headed to Horton Archery's Camp Opportunity in 1995 to see what the fuss over crossbows was all about. The exaggerations of TV shows were quickly dispelled when the pro staff showed me the proper use of a crossbow, along with offering the admonishment not to take any shots over 20 yards. The sound a crossbow makes upon releasing its arrow can alarm a deer, which gives it time to react and "jump the string" if shots are taken beyond that range.

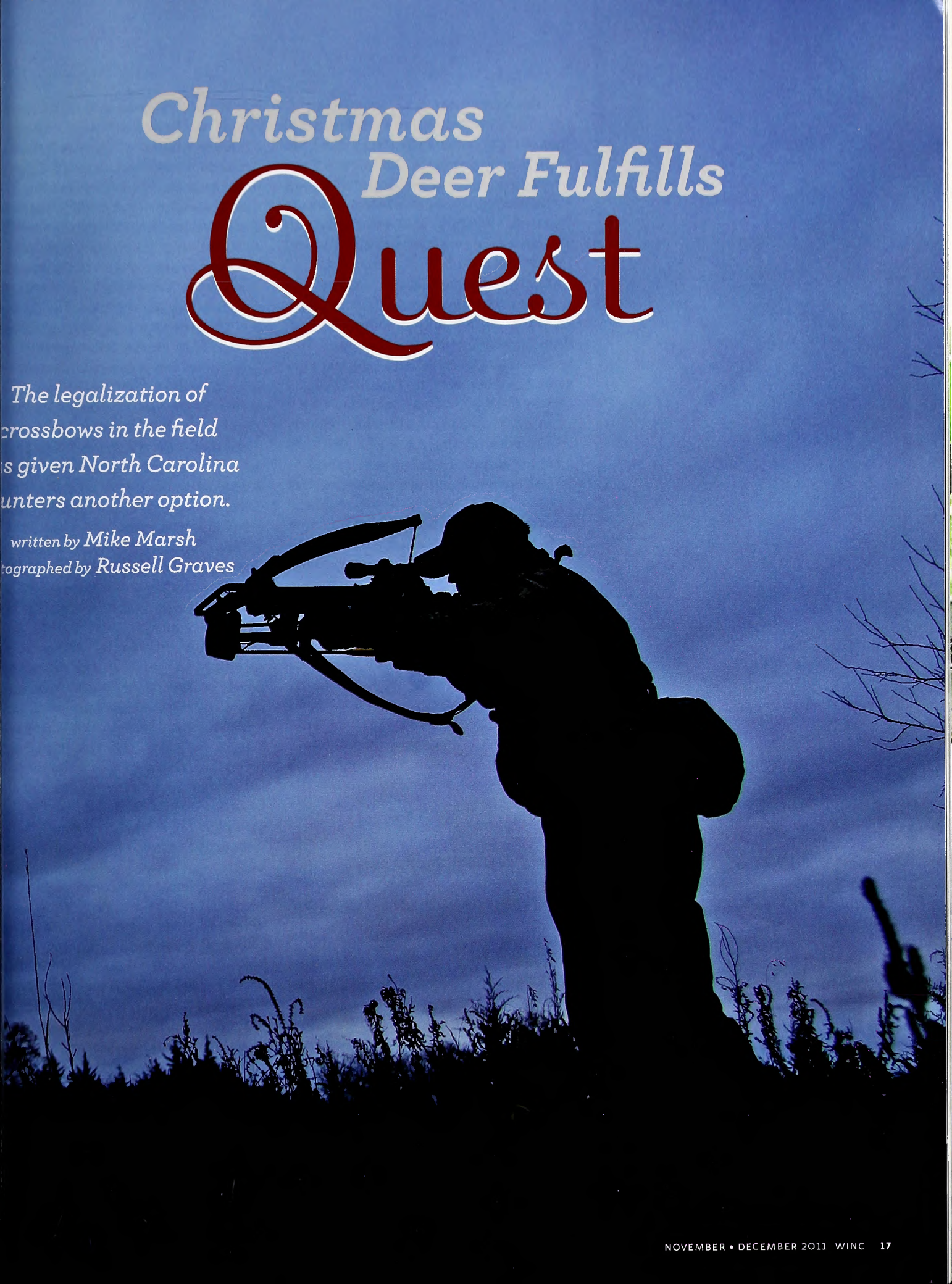
Arrows shot from recurve and compound bows retain more energy at longer ranges, which is another reason a crossbow has a much shorter range. Once armed with the proper knowledge and discipline, I headed into the Ohio forest for my Horton hunt. At dawn, I aligned the crosshairs on a large doe that was silhouetted against 10 inches of new snow. The arrow flew true and downed my first crossbow deer.

The next two decades saw a burgeoning deer herd across the nation, not just in North Carolina. Changes were made in many states' regulations, liberalizing season lengths and creating either-sex seasons and special

Christmas Deer Fulfills Quest

The legalization of crossbows in the field is given North Carolina hunters another option.

written by Mike Marsh
tographed by Russell Graves



weapons seasons. North Carolina citizens, insurance interests and farm organizations were requesting relief from deer depredation and vehicle-deer collisions.

In 2009, I almost had a chance to hunt with a crossbow. An orthopedic surgeon gave me the grim news that three of the four ligaments in my right shoulder's rotator cuff were torn. That meant no guns, no fishing rods and certainly no bows for many months. But I could not qualify for a disabled permit to use a crossbow because my disability had not lasted for one year or longer. So I sat out the 2009 bow season, missing archery hunting for the first time in 27 years.

Harvey White is the N.C. Wildlife Resources Commission's assistant manager for customer support services. He keeps tab of the number of hunting and fishing licenses and special permits.

"The last full year for disabled-hunter crossbow permits was July 1, 2009, through June 30, 2010," White said. "That year 1,588 permits were issued. The total active permits as of June 30, 2010, counting that 1,588, was 17,493. During the last year, which ran from July 1, 2010, to April 29, 2011, we issued only 168, before the crossbow ban was repealed on April 28, 2010."

But repeal of the ban wasn't the only obstacle to crossbow hunting. The requirement to obtain a pistol permit from the resident's county sheriff was still in place. The process took me several days, plus two trips to the New Hanover County sheriff's office, and the pistol permit itself cost $5.

In 2010, five states legalized the use of crossbows for hunting. Along with deer herds reaching nuisance levels in some people's minds, hunter recruitment and retention had become watchwords for advocates of change. But dealers in North Carolina ha a difficult time keeping up with the ne demand for crossbows, despite a delay in implementation of crossbow hunting, wh was approved in March 2009 by the Wild Commission. Protests lodged under the Administrative Procedure Act had put of crossbow hunting and given manufactur an extra year to build up their stocks. Th crossbow hunting regulation finally wer into effect on Aug. 1, 2010, along with th green light for Sunday bow hunting.

I ordered my crossbow directly from Horton Archery. Upon its delivery, I hac to show the common carrier a copy of m crossbow permit. The process became much more convenient for those who wished to purchase a crossbow for the 2011–12 hunting season because the N.C General Assembly eliminated the pistol permit requirement.

Gordon Myers, the Wildlife Commis sion's executive director, said crossbow are important for keeping the state's de population under control, as well as for recruiting hunters.

"The rules provided increased huntin opportunities," Myers said. "Crossbow allow a broader spectrum of equipment t be used by more participants, which can help achieve our goal of increasing the de harvest, especially in our growing urbani areas where discharging a centerfire rifle not allowed. For hunting in urbanized are a crossbow is a more efficient hunting weap than a handheld bow."

Sunday hunting is allowed on private land only, giving the landowner discretio over the use of his property. Hunting mig tory game birds is not allowed, to preve conflicts with the federal season framew that would result in fewer hunting days f game birds that are hunted more effective with firearms.

"Lots of people work six days a week, and children are enrolled in other activiti on Saturdays," Myers said. "Archery hunt ing is one more opportunity to hunt that includes families. The increased oppor tunities also have the support of the Farm Bureau and Soybean Growers Associatio

Chris House is an avid hunter from Wilmington who hunts deer during all of the special weapons and regular gun seasons. He has accompanied me on som

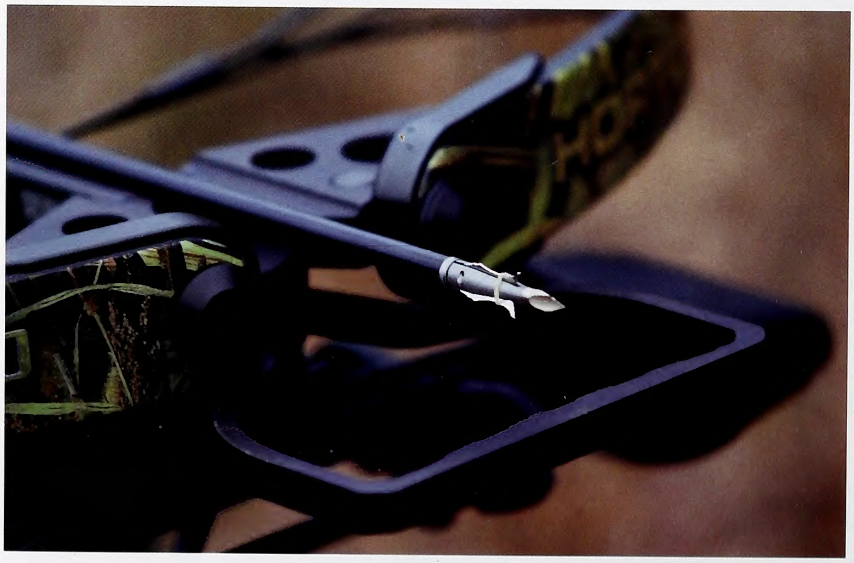
CROSSBOW SAFETY TIPS

The N.C. Wildlife Resources Commission recommends the following:

- Never carry a crossbow cocked and loaded with an arrow.
- Keep fingers and thumb below the rail at all times.
- When cocking, be sure that your foot is firmly planted in the cocking stirrup.
- Never dry-fire a crossbow because firing without an arrow can cause sudden breakage.

While using a tree stand, all hunters should maintain three points of contact when climbing up or down; wear a full-body safety harness; and check belts, chains and attachment cords before use. When using a crossbow in a tree stand, cock the crossbow on the ground before climbing.

- Load the crossbow only when in hunting position.
- Always use a haul line to raise or lower an unloaded crossbow.
- Keep the haul line away from the trigger mechanism; haul the crossbow stock-first.
- Clear away any tree branches before taking a shot.



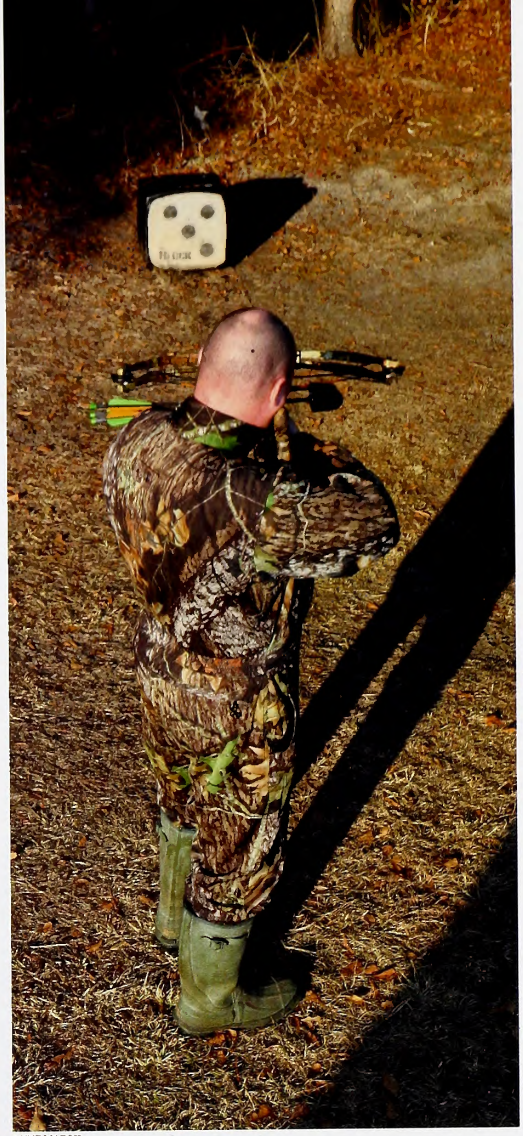
sbow hunts, as well as hunting other
perties on his own.
I hunted with a compound bow for
ears," Chris said, "but I dislocated my
ılder several years ago. Now, at age 42,
having problems drawing a bow, so I'm
to have the option of using a crossbow."
Chris bought an entry-level crossbow, a
ıett Jackal, including a red dot sight and
ws, for $380. He said the advertised
ıcity is 315 feet per second, which
kes it effective on inanimate targets
to 40 yards.
It's much noisier than my compound
," he said. "So I wouldn't take a shot at
er past 20 yards, otherwise the deer
ht hear the noise made by the bow and
p out of the way of the arrow."
His hunting leases are located in Pender
Bladen counties. But Chris said he also
a few honey holes in New Hanover
ınty. "The places where I hunt in New
ıover County allow only archery hunt-
because there are houses nearby," he
l. "I have one place where the landowner
ıts to control deer that are getting into a
etable patch."
Chris said his crossbow is easy to cock
ng the manufacturer-supplied cocking
e. It is also very accurate, shooting groups
n inch or less at 20 yards. Compared to
hours of sighting-in and practice required
h his compound bow, shooting the cross-
v is a snap.
"It took me 10 minutes to sight it in," he
l. "But, just like anything else mechanical,
ı have to constantly check it over, making
e the string isn't cut or worn and that all
bolts are tight."
Though he hunted with a crossbow four
es, Chris saw only two deer. One was a
ke buck and the other a young doe he did
want to take. "I hunted only one Sunday,"
said. "My first Sunday hunt gave me a
se of freedom. I now have the choice of
ether I can hunt on Sunday."
Protests against crossbow hunting
luded arguments that too many deer
uld be harvested, to the detriment of
ıters using traditional bows. Time will
if that's the case. But the harvest statis-
s for all big-game animals — deer, turkey
l bear — for the first crossbow season
l provide baseline data.
Evin Stanford, the commission's deer,
key and wild boar biologist, said he was surprised at how high the crossbow deer harvest was, with 2,959 deer taken during the 2010–11 season, compared to the bow harvest of 13,646. The turkey crossbow harvest during the 2011 spring wild turkey season was 40, and the bow harvest was 254. The 2010–11 crossbow bear harvest was seven, and the bow harvest was 55.

"I think crossbow hunting is something a lot more people will participate in over time, especially people who are new to hunting and may not have had much experience with bows and arrows," Stanford said. "Before last year, you would have had to get a permit before hunting with a crossbow. Doing away with the pistol permit requirement makes hunting with a crossbow much easier for most people."

Despite how easy it is to become involved in crossbow hunting this season, getting the chance to hunt a deer with a crossbow on Sunday on my own property had been anything but easy. It was the culmination of a lifetime quest, which included hard work, research and supporting the commission's Sunday hunting and crossbow hunting proposals. It was the result of waiting out a flood and perching like a hawk waiting for just the right opportunity in a tree stand over many hunting days. My bow, with its reverse draw design and scope, was the culmination of a metamorphosis in archery weapons that began thousands of years ago. Its arrows achieved velocities exceeding 300 feet per second, and its compound bow limbs with their cables and cams promised compact maneuverability and quiet projectile delivery. Despite its modern innovations, the crossbow in my hands was still limited for hunting purposes to a range of no more than 20 yards — further dispelling TV's sheriff of Nottingham myth.

When the deer stepped within that magic distance, I released the safety and pressed the trigger. After waiting for the adrenaline surging through my veins to subside and for my knees to stop shaking, I lowered the crossbow on a rope, then climbed down the tree stand ladder and followed the blood trail to the deer. My first North Carolina crossbow deer would grace our family's holiday table.

Mike Marsh's new book, "Fishing North Carolina," is available from Marsh at 1502 Ebb Dr., Wilmington, N.C. 28409 for $26.60, check or money order.



MIKE MARSH

A crossbow produces more noise than a compound or recurve bow, thus making it more effective for shots from 20 yards and in. On longer shots, the deer might "jump the string."

■ BARN OWL (*Tyto alba*)

Due to changing farming practices, this species appears t
be declining throughout the state. Barn owls are permanen
residents of North Carolina and appear to mate for life. Thes
owls do not build nests but often deposit their eggs in a
hollow tree or loft in a barn, hence their common name.

Portraits of Diversity PHOTOGRAPHED BY TODD PUSSER

BIRDS

North Carolina contains the most biodiversity of any temperate region in the world. This series highlights the unique diversity of life found within our state's borders, photographed against neutral backgrounds to emphasize each species' individual characteristics.

Of all the creatures in the natural world, birds are the flashiest and the easiest to see. With their diverse behaviors, beautiful songs and dazzling colors, birds have captured the imagination of humankind for thousands of years.

Currently scientists recognize over 10,150 species of birds throughout the world, with many new species being described each year. North Carolina, with its varied geography, mild climate and strong ocean currents, has played host to over 460 species of birds. Some birds are found seasonally in our state, having traveled thousands of miles to feed and rest here. Others are permanent residents of the state, spending their entire lives here breeding and raising young.

Birds have played an integral role in human society for millennia, perhaps as much as any other group of vertebrates. Humans have domesticated birds such as ducks, chickens and turkeys for food. We hunt species such as quail and mourning doves for sport and the table. More Americans watch birds than all professional sporting events combined. Bird watching is such a popular pastime that websites and hotlines have been established all over the country for reporting rare bird sightings. According to the U.S. Fish and Wildlife Service it is estimated that bird watching brings in over $10 billion to the economy of the United States each year alone.

Birds also provide a wealth of environmental services including seed dispersal, flower pollination and insect control.

For the purpose of this feature, I photographed birds in a head-and-shoulder profile against neutral black or white backgrounds. This type of photography forces one's eye to concentrate on the birds themselves without any distracting background elements in the frame. To gain access to a number of different species, I worked with licensed bird-banders and professional wildlife rehabilitators such as the Carolina Raptor Center in Charlotte.

The goal of this feature and others in this series is to celebrate the spectacular diversity of life found in North Carolina. We are fortunate to live in a state with so many incredible natural wonders, many of which are protected in state parks and national wildlife refuges. Take time from your busy day and step outside. Listen to birds singing in the distance. Take a trip to the coast in the winter to see the vast aggregations of ducks and geese that visit our state at that time of year. Head to the mountains in the spring and look for warblers, the jewels of the bird world, as they migrate from their winter homes in the tropics. Watch a hummingbird visit a feeder on a hot summer day. Learning about birds will help develop a greater appreciation for the amazing diversity of life found in North Carolina.

–Todd Pusser

RED-SHOULDERED HAWK (*Buteo lineatus*)

This is a common breeding bird in North Carolina found wet bottomland forests. These raptors nest in the sprir when their high pitched calls are frequently heard. Th species preys on a variety of subjects, including crayfis small mammals and snakes.

LEACH'S STORM PETREL (*Oceanodroma leucorh*

This small seabird visits the offshore waters of North Carolina seasonally from the spring into early fall. Like albatross and shearwaters, storm petrels are members of an order of birds commonly known as "tubenoses." Tub noses derive their name from the shape of their bill, whic allows the bird to discharge excess salt water that is swa lowed while feeding or preening.

GREAT CRESTED FLYCATCHER (*Myiarchus crinit*

This species is a common summer resident throughout North Carolina. These birds nest in natural cavities and lay four to six eggs. Like their common name suggests, this species readily feeds on insects occasionally supplementing their diet with the fruits of flowering dogwood or pokeweed.

RUBY-THROATED HUMMINGBIRD (*Archilochus colubris*)

This common summer resident is the only breeding species of hummingbird found in North Carolina. It is also the smallest species of bird found in the state. Hummingbirds can beat their wings over 50 times per second and have the unique ability to fly backwards or even upside down. A male is pictured on the left while a female is illustrated above.

EASTERN SCREECH OWL (*Megascops asio*)

This small owl is a common permanent resident found in woodlands throughout the state. It is a cavity nester and will readily take to man-made bird boxes provided they are large enough. Its call, a sort of whiny whistle, can easily be heard on warm spring nights.

GREAT HORNED OWL (*Bubo virginianus*)

This is our largest species of owl and a fairly common permanent resident of North Carolina. It breeds in open woodlands and is an incredibly powerful predator that can tackle large prey such as skunks. Its call is a series of four to seven resonating hoots and can easily be heard on calm nights. Locals often refer to this species as the "hoot owl".

BLACK-CROWNED NIGHT HERON (*Nycticorax nycticor*

Though this secretive species can be found throughout the state, it is most common along the coast of North Carolina where it is a common permanent resident. Night herons, as their name suggests, are frequently nocturnal and have a penchant for feeding on crabs and small fish.

MISSISSIPPI KITE (*Ictinia mississippiensis*)

This species appears to be increasing in North Carolina where it is a summer resident of the Coastal Plain. This small raptor often feeds in flocks, forming large kettles of birds that soar over hot air thermals.

BALD EAGLE (*Haliaeetus leucocephalus*)

This species was removed from the Endangered Species List and can now be found near every major body of water in North Carolina. With a wingspan of over 6 feet, it is one of the largest birds of prey found in our state.

AMERICAN KESTREL (*Falco sparveri*

This small, colorful falcon is a permanent resident of the state where it can found ove open fields and woodlands feeding primaril on grasshoppers, small lizards, songbirds and mice.

MALLARD (*Anus platyrhynchos*)

This popular game species is a common winter resident in freshwater habitats throughout the state. It is regularly domesticated, and many of the ducks found in the state originated from introduced stock.

EASTERN TOWHEE (*Pipilo erythrophthalmus*)

Towhees are common permanent residents throughout North Carolina. The species nests in the spring and can often be heard scratching in the leaf litter as it searches for insects and seeds. A female is pictured here.

RED-COCKADED WOODPECKER (*Picoides borealis*)

This endangered species nests only in mature longleaf pine. It is an uncommon permanent resident of the state primarily found in the pine forests of the Sandhills Gamelands and Fort Bragg. It is unique among native woodpeckers in that offspring often remain with the parents to help raise young the following year.

CAROLINA PARAKEET (*Conuropsis carolinensis*)

This beautiful species was once common throughout the Coastal Plain of North Carolina but is now extinct. The species was hunted mercilessly for its colorful feathers and killed for raiding croplands. A preserved specimen from the North Carolina Museum of Natural Sciences is pictured here.

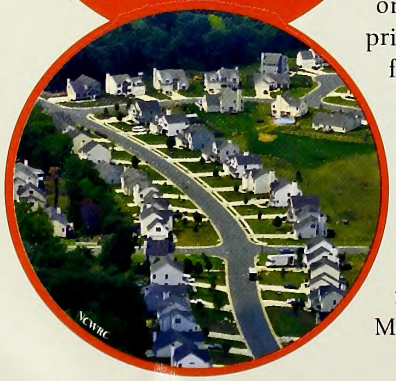
Planning for Wildlife

The commission's Green Growth Toolbox provides ways for development—and wildlife—to coexist.

BOX TURTLE

Written by Carolyn Rickard

Illustrated by Tim Lee



In the wildlife-rich landscape of North Carolina's mountains, a change has been steadily taking place. Homes have been built. Shopping centers have appeared. Neighborhoods have popped up where there once were forests. And those developments are encroaching on the sensitive habitat of many of North Carolina's species of wildlife.

The mountain region continues to see significant development growth, especially at high remote elevations. "We're seeing a lot of growth out here, even with the economic slowdown we have had," said Linda Giltz, a regional planner with the Land of Sky Regional Council who is working with planners and developers in western North Carolina on green planning issues. "We have seen people pushing into areas where we hadn't seen development in the past, and there are impacts on erosion, scenic quality, water quality and wildlife habitat."

Similar scenarios are playing out across North Carolina.

But in recent years, the N.C. Wildlife Resources Commission has taken steps to try and minimize some of the damage done by some development practices and lack practical, science-based tools for development planning across the state. And recognizing that development is also important, the commission isn't trying to stop it—biologists are trying to show municipal planners that communities and wildlife can live side by side.

The commission's Green Growth Toolbox aims to provide cities and counties with the data they need to make intelligent development decisions—and plan growth in such a way that it won't harm wildlife habitats.

The Green Growth Toolbox tries to spread the message that sprawling development without regard to habitat impacts wildlife. The same development built on a disturbed or degraded site has less impact than that development built on pristine habitat. A development close to existing infrastructure is less likely to fragment habitats and movement corridors than that same development out in the countryside. The impacts to hunting opportunity and habitat management on adjacent lands are not always considered by planners, town officials and the general public.

Between 1990 and 2000, the state's population jumped by 21 percent. By 2030, North Carolina's population is expected to grow by another 50 percent. The state will have over 12 million people living on its landmass of about 22 million acres. That means one thing: more houses and neighborhoods and roads. More schools, shopping centers and parking lots.

While the Wildlife Commission is tasked with conserving the state's wildlife, county and municipal governments set most land use policy in the state. Historically, insufficient information has been shared between the two. The Green Growth Toolbox aims to fill that gap, and help plan growth that will minimize harm to habitats.

The idea of the Green Growth Toolbox isn't to stop communities from growing. It is to work with them to find a better way to allow those neighborhoods, industrial areas and commercial areas to coexist with the species and habitats that need protecting. The recommendations are based on sound science and are completely voluntary—each local government can decide what to use, and to what extent.

"We're not trying to work against developers or stop development," said Jeff Marcus, a wildlife diversity biologist with the Wildlife Resources Commission. "We are raising awareness of the value of habitat, and making a connection between the biologists, planners, communities and local governments. We are providing communities with the information they need to make sound planning decisions."

The toolbox works in several ways. Planners and municipal leaders can visit a website to download a handbook, which includes information on the value of green planning and provides an array of examples and best practices for "greening" municipal ordinances, land use plans and developments. The toolbox and website also include GIS data and maps, much of it county specific, on watersheds, streams, wetlands, rare species occurrences, managed lands and other wildlife habitats. A planner can link to maps that will show which area of a county is high priority for wildlife habitat. Or the planner can find examples of green ordinances from model communities around the country.

"Some of this information was out there before," said Kacy Cook, a biologist with the commission. "But this is a one-stop shop. This is a place where planners can come and get all the information in one accessible place. We use data from and also try to link to all of the other important natural resource conservation tools available in the state such as the N.C. Natural Heritage Program's Conservation Planning Tool and N.C. State University programs, including Watershed Education for Municipal Officials."

"Proactive planning is necessary especially in the coastal plain of North Carolina, because it is considered a biodiversity hotspot, meaning it contains a large number of plant and animal species, some found nowhere else in the world. Also, coastal North Carolina has been developing extremely quickly and we need to balance the needs of humans and our natural environment."

Planners may also attend a workshop on green growth. There, they will get information about the status of local wildlife and wildlife habitats, GIS data and ways to enhance mapping and land use policies to conserve wildlife habitat while accommodating development.

The Wildlife Resources Commission has partnered with Coastal Land Trust, Sustainable Sandhills, Sandhills Conservation Partnership, and Land of Sky Regional Council to deliver those Green Growth Toolbox workshops and technical guidance. Funding has come from the Wildlife Conservation Society, State Wildlife Grants, and the N.C. Non-Game and Endangered Wildlife Fund.

Kristen Howell, conservation specialist with the Coastal Land Trust, said the toolbox works as an educational tool to raise awareness of some of the needs of the more sensitive habitat areas of the state. A June 24 workshop she held at Lake Waccamaw State Park drew 26 town and county planners, parks and recreation staff, economic development staff and community development staff.

"Proactive planning is necessary especially in the coastal plain of North Carolina because it is considered a biodiversity hotspot, meaning it contains a large number of plant and animal species, some found nowhere else in the world," Howell said. "Also, coastal North Carolina has been developing extremely quickly and we need to balance the needs of humans and our natural environment."

In Stanly County, in the southern Piedmont region of North Carolina, finding the Green Growth Toolbox meant considering something county planners hadn't considered before—wildlife.

"We had not typically involved wildlife as a land development issue," said Michael Sandy, planning director for Stanly County. "Here in Stanly we have an abundance of wildlife and open areas that harbor some good species that need help to retain their wildlife habitat. We did find the Green Growth Toolbox helpful in that we made modifications to our plan on areas not to encourage growth in."

That process with counties doesn't happen in a vacuum. Sandy and other

nty personnel met with Cook several es, and she presented information to the nty's Board of Commissioners. Cook attended several committee meetings elp update the plan. As a result, Stanly nty plans to continue to use the Green wth Toolbox when it updates its Sub-sion Ordinance.

Regular communication with planning artments, governing boards, developers l consultants, Cook said, is key because rporating ecosystems and wildlife itat into land-use planning and devel-nent standards is relatively new to our e. Cook, along with the Green Growth lbox partners, reaches out to all parties lved in land use and development, attend rd meetings, give presentations and d workshops.

"Support from communities and leaders pens when they understand the value nd threats to our ecosystems and wild-and the positive effects on quality of life l the economy," Cook said.

In Stanly County, Cook's continuing ntact with Sandy and other staff mem-s seems to have worked. Sandy plans to ntinue to use the toolbox in the future. "This will be a topic to have the devel-er address when they submit plans," dy said. "We are more on the sensitive e when we look at development now."

Other counties have also found the wealth data useful in reviewing developments. The Triangle region, Orange County staff s the conservation data to review poten-development projects, said Rick Shaw, d conservation manager for the county. "Conservation data is not only useful for ntifying priority sites for conservation, but o for making a strong case to our elected cials and the public at large as to why it would be in the public interest to spend time, effort and funds to conserve those areas," Shaw said.

Shaw said he also consults the models of other green ordinances when developing or improving local ordinances.

The mountainous regions of western North Carolina are also looking for ways to maintain the natural environment, with more than 400 endemic species, including wildlife and medicinal plants. And when you preserve habitat, you also preserve agricultural land and water quality, Giltz said.

Much of the initial goal of the toolbox, she said, is simply educating planners about the rich landscape around them.

"Short term, our goal is really the education on the importance of our landscape and our resources," she said. "We want to identify where are those important areas to preserve, and develop sensitively around those areas. Longer term, we want to incorporate those things into regional and local plans, and then even longer term, we hope to see on-the-ground results from it all."

Education is key in the initial phases of the 3-year-old Green Growth Toolbox, Marcus said. While developers might not be ready to jump in and make full-fledged changes—and the economy is halting some development right now—towns and cities are learning how to create guidelines that work to efficiently accommodate development while maintaining ecosystems and wildlife habitat.

"The ultimate on-the-ground impact takes time to be realized from what we are doing now," Marcus said. "It's a long-term investment to get results, and right now we are raising awareness. We're really encouraged by the early results, but the jury is still out on the ultimate impact because that is in the hands of planners and community decision makers."

Since mid-2010, more than 170 land-use planners in 45 communities have been trained in day-long Green Growth Toolbox workshops. More than 10 communities—across each region of North Carolina—have incorporated green growth principles into their land use plans or have used them to update ordinances.

Anson County in the southern Piedmont signed on in supporting the toolbox after Cook made a presentation before the county commissioners. Soon after, county planner Jennifer Baptiste attended a training session. While no significant development has occurred in the county in recent years, the county is currently adopting zoning, and is using the GIS data provided by the toolbox to inform zoning districts.

"We have added several measures from the toolbox into our long-range plan," Baptiste said. "It has also been included into the long-range plan for two local municipalities—Wadesboro and Polkton. The county has also designed a Resource Conservation District."

Getting counties just to think about wildlife and habitat when planning for development is a triumph, Marcus said. Using zoning and GIS data, and being aware of streams and flood plains means that municipalities can plan in such a way that development can happen with minimal impact on wildlife.

"We do surveys when people attend our workshops," Cook said. "Consistently, over 80 percent of people say, yes, this information is needed. They are glad this information is now more accessible." ◆

Carolyn Rickard is a public information officer with the North Carolina Wildlife Resources Commission.

Find Out More

To find out more about the Green Growth Toolbox and to download a copy of the handbook go to ncwildlife.org/greengrowth.

Wildlife IN NORTH CAROLINA
MARCH 1968
Wildlife in north carolina
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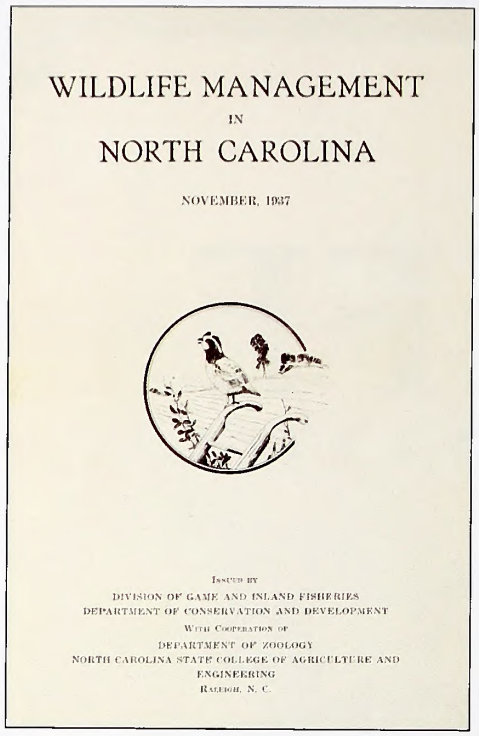
IN NORTH CAROLINA

WILDLIFE IN NORTH CAROLINA

As the Great Depression began to wane in November 1937, a small pamphlet appeared entitled *Wildlife Management in North Carolina*. The eight-page publication, a production of the Division of Game and Inland Fisheries with the assistance of N.C. State University, would in May 1946 change its title to *Wildlife in North Carolina*.

The magazine's goal was stated simply: "The purpose of this pamphlet is to bring together and present in brief form the ideas, management practices, research activities, and progress of game management in the field for the benefit of farmers and landowners, sportsmen, game managers, biologists, and students of game management in this State."

Though much has changed since 1937, the goal of *Wildlife in North Carolina* remains much the same, although it now reaches more interest groups. It is in essence a goal of preservation and increase of our natural resources. It is a worthy and lofty goal that still guides us at the magazine.

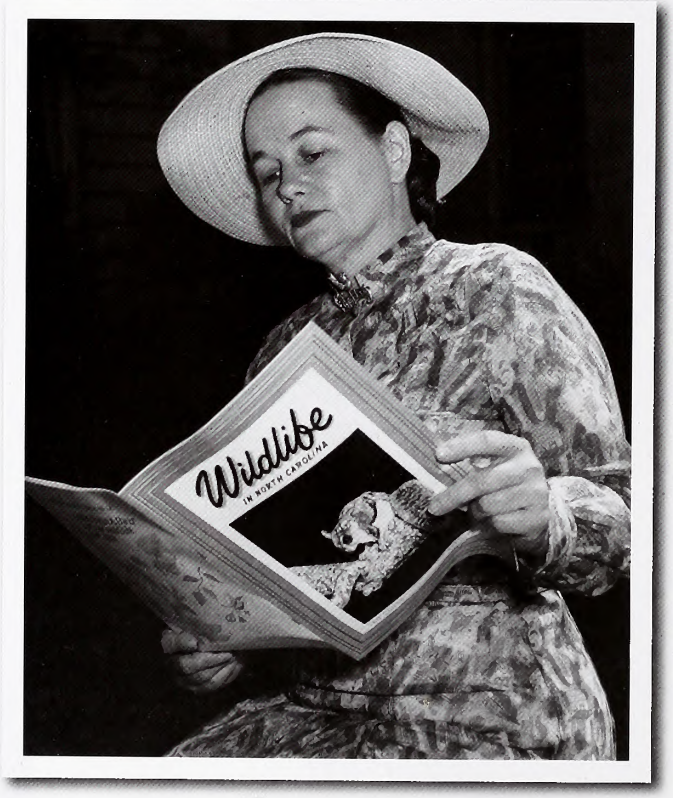

WILDLIFE MANAGEMENT
IN
NORTH CAROLINA

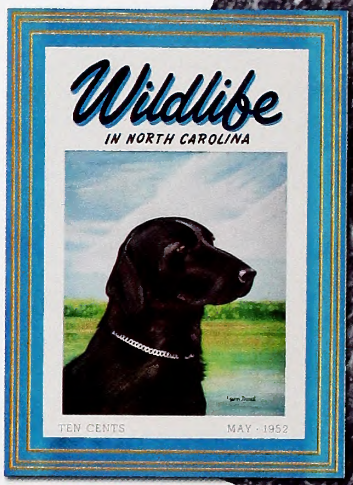
NOVEMBER, 1937

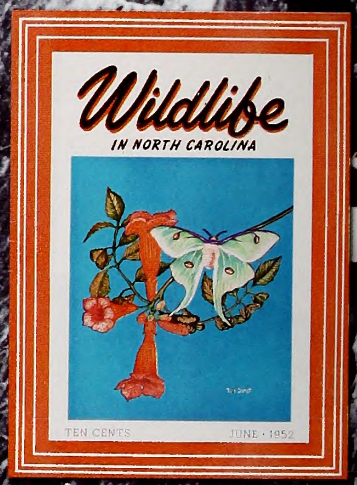
ISSUED BY
DIVISION OF GAME AND INLAND FISHERIES
DEPARTMENT OF CONSERVATION AND DEVELOPMENT
WITH COOPERATION OF
DEPARTMENT OF ZOOLOGY
NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING
RALEIGH, N. C.

1937

Appropriately enough, a bobwhite quail adorned the first issue of what would become *Wildlife in North Carolina*. Through the years, the magazine has written as much or more about bobwhites as any other species. Once again, the image of a bobwhite graces the cover of our magazine.







1950s

Styles change, fashion comes in and out of favor, but *Wildlife in North Carolina* has been a constant through its 75 years. Among the many magazine covers, one typifies the joy of fishing — two Manns Harbor youngsters obviously delighted with their cane-pole catch of bluegills and white and yellow perch from East Lake. The lad on the left is current commission vice chairman Ray White. His brother is state Senator Stan White.

1940s

The magazine was on hiatus from August 1945 until May 1946 when it resumed publishing with a new name, *Wildlife in North Carolina*, and a new size, 8 1/2 inches by 11 inches. The rejuvenated magazine was published as a quarterly, then bimonthly and finally in September 1948 monthly. In June 1949, the first color cover appeared, a painting of mourning doves by staff member Win Donat. The first color photograph on the cover came in July 1949, a Pasquotank River scene by Bill Sharpe of the State News Bureau.

Taylor

Fever, and deaths from this disease, than any other state. That's why those who plan to spend time outdoors this summer should be careful to avoid ticks.

Almost all our cases of Rocky Mountain Spotted Fever come from the Piedmont," said Dr. Charles Apperson, medical entomologist with the N.C. State University Extension office. "Only the American dog tick carries the virus, and people can contract the disease only through the bite of an infected tick."

North Carolina had 204 reported cases of Rocky Mountain Spotted Fever in 1978, and six of the cases resulted in deaths. Children from age 4 to 15 are most affected because of the amount of time they spend outdoors in the summer when ticks are most prevalent. The disease, however, is most dangerous to people over 40 years old. Entomologists estimate that five percent of the dog tick population carries the disease.

Symptoms of the disease appear within two to 14 days following the fever, chills and aches and pains. A rash often breaks out around the wrists and ankles. If the disease is not treated, the fatality rate runs about 17 percent and many of the survivors may die years later from body organ damage caused by the disease. If the disease is caught early, the mortality rate still runs about five percent.

"The first thing people should do if they find a tick on them is to remove it," said Apperson. "Fortunately, the tick has to be attached for six hours to be able to transmit the fever to a human being. After removing the tick, mark the calendar on the day the bite occurred. If any of the symptoms of the fever appear within two to 14 days following the bite — chills, headache, rash, fever, or aches and pains — seek treatment immediately."

The American dog tick can be distinguished from the Lone Star tick and the black-legged tick, neither of which carry the disease. The Lone Star tick has a distinctive white spot in the center of its back and the

When removing a tick, it's important to use tweezers or a paper towel while holding the tick. An engorged tick can transmit the disease through even minute breaks in the skin. There is no effective vaccine for Rocky Mountain Spotted Fever, and the vaccine used in the past has been taken off the market.

Barbara Whaley, program specialist for the Rocky Mountain Spotted Fever project, is also working to reduce the incidence of Rocky Mountain Spotted Fever.

"The key to reducing spotted fever cases is education," she said. "We've designed four programs on ticks and spotted fever for all age groups. These tell how the fever is transmitted and how to guard against it."

Anyone wanting more information on Rocky Mountain Spotted Fever should contact the Rocky Mountain Spotted Fever Project, Extension Entomology, Box 5215, Raleigh, N.C. 27650, or call 1-800-662-7301 and ask for tape numbers 2712, 2713, and 2714.

22

Duane Raver Retires As Editor of WILDLIFE

DUANE RAVER, JR. is one of the nation's most recognizable names in the field of wildlife art, and for nearly 20 years, he has also been the primary reason for the very existence of WILDLIFE IN NORTH CAROLINA.

Beginning in July, Duane will retire as editor of this magazine to pursue a career as a full-time free-lance wildlife artist. Duane's association with the North Carolina Wildlife Resources Commission goes all the way back to 1950 when he was first hired as a fisheries biologist, a position he held until 1960 when he became Managing Editor of WILDLIFE. In 1973, he was named Editor, but those of us who have worked with him over the years know that this hardly tells the whole story.

Indeed, for many years, Duane virtually put this magazine together from start to finish single-handedly, and it is a tribute to his success that WILDLIFE has attracted a growing following over the years until it is now considered one of the top state wildlife publications in the country.

"A few months after I came on the job back in February of 1950," Duane recalls, "I was issued a 14-foot boat, an old 10-horse Mercury, a couple of seines, and a crew of three college kids. Harry Cornell, who was then chief of the Fish Division, told me I had three months to survey 14 lakes with my crew.

"Fortunately, since I was less than a year out of college, I knew just about everything there was to know about fishery biology and lake investigations," he says kiddingly. "My crew was the only thing I wasn't too sure of. There was a big, blond boy in jeans and sneakers who looked like he just got off a surf board; a dark, quiet kid who kept looking things up in a fish book he carried; and a skinny, studious youngster who I knew could never hold down his end of a big seine.

"I guess I must have done something right though," says Duane. "Frank Richardson (the blond) is now assistant regional director with the U.S. Fish and Wildlife Service in Atlanta, Don Baker (the quiet kid) is now chief of the N.C. Wildlife Resources Commission's Division of Inland Fisheries, and Gene Hester (the skinny kid) is associate director of Environment and Research for the Fish and Wildlife Service in Washington, D.C."

Despite his modesty, Duane hasn't done too badly either. In addition to editing this publication, he has been drawing fish and game birds since 1951, and completed well over 100 front cover paintings for state wildlife magazines, including this one. He has illustrated fish books for North Carolina, Virginia, Oklahoma, Louisiana and drawn a series of 41 fish for the U.S. Fish and Wildlife Service. His fine paintings are hanging in countless homes across the nation, and he has won many awards, including the N.C. Wildlife Federation's Wildlife Artist of the Year in 1972, 1975 and 1976.

He has lost track of just how many paintings he has made over the years, but he certainly has no plans to quit painting.

"I'm anxious to get into illustrating and painting full-time, and wildlife will continue to be a big part of my life," says Duane. "The Wildlife Commission has been much better to me than I've been to the Commission, and I've been associated with many, many great folks. I only wish that I had taken time to know more of them in a closer way."

Duane, who is a native of Newton, Iowa and a 1949 graduate of Iowa State College, lives with his wife, Mary, and family in Cary. His daughter, Duane, is a practicing taxidermist, and a second daughter, Jean, is assistant manager of a Raleigh jewelry shop. His son, Dick, is in senior accounting at Hardbargers Business College.

No doubt about it, we'll all miss Duane up here, and nobody is looking forward to that first deadline when we'll need his help and he'll be out there somewhere painting another super fish or quail. But we hope — like many of you — that we'll still be able to get our hands on some of those paintings from time to time so we can show them to you in WILDLIFE IN NORTH CAROLINA.

1960s & 70s

Duane Raver (above) is a man of many talents: fish biologist, writer, editor and artist. Raver worked for the commission for many years, starting in 1950 as a fisheries biologist before joining the magazine in 1960. He served as editor from 1973–79. For many years, Raver, an Iowa native, produced *Wildlife in North Carolina* almost single-handedly.

Raver is most widely known as an incomparable wildlife artist, and his paintings graced the covers of many issues of *Wildlife in North Carolina*. Shown to the left are Raver's covers featuring (left to right) black crappies (Feb. 1966), mourning doves (Sept. 1972) and a bluegill (June 1979). Raver, who retired in 1979, continues to produce paintings.

1980s & 90s

Upon its 50th anniversary in 1986, the magazine displayed a number of covers from different periods of its history. Among the staff at the time were editor Jim Dean, associate editor Larry Earley, assistant editor Mark Taylor and art director David Williams. Dean, who continues to contribute columns and stories to *Wildlife in North Carolina*, served as editor for 19 years.

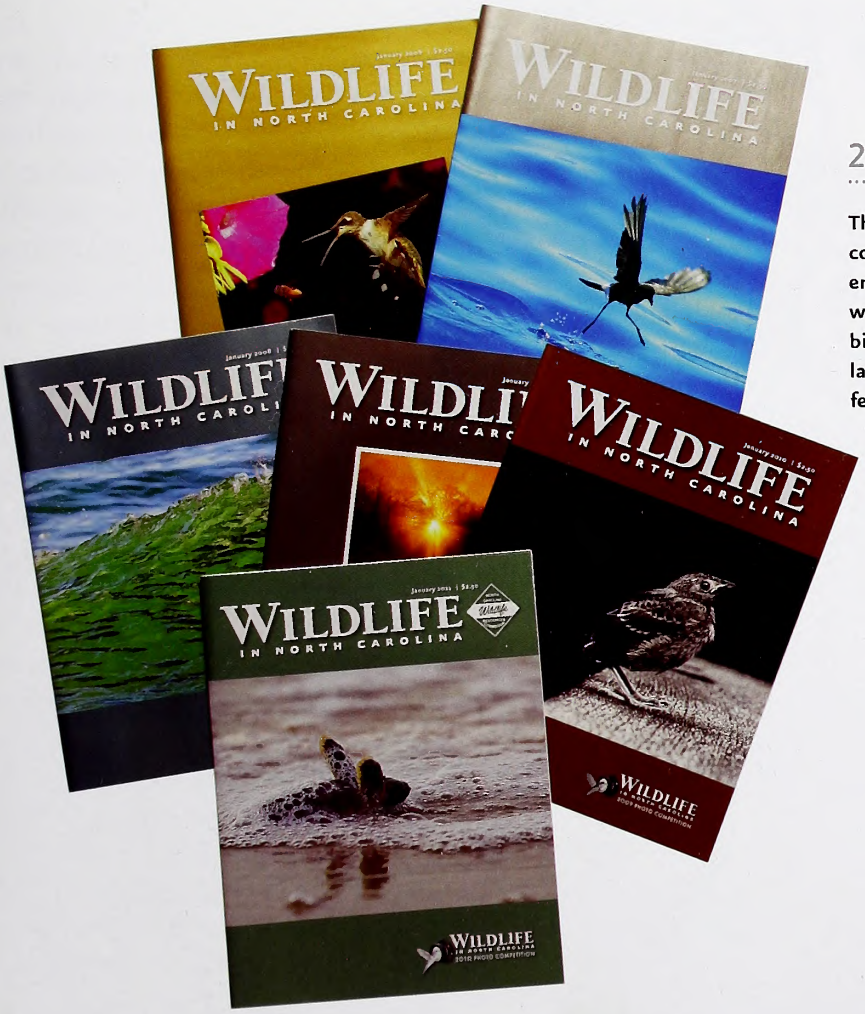
"When I came to work for Wildlife in Nort*h Carolina in 1969, Rod Amundson was th award-winning editor and Clyde Patton wa the executive director of the agency. Clyd and Rod had been there from the beginnin and I worked alongside Duane Raver wh painted all the wonderful covers, and fo lowed Rod as editor. There was no doubt i my mind then, or now, that I had lucked int one of the best jobs in state government."*

–Jim Dean, editor from 1979–199

Many employees have worked to produce *Wildlife in North Carolina*. Among them were (clockwise from above) former graphic designer Erin Hancock Hart (seated) and former editor Rodney Foushee, photographer Melissa McGaw, former photographer Ken Taylor and former art director Donnan Robbins (center).

75th ANNIVERSARY ISSUE Since 1937

Since the series began in 1981 (with the gray squirrel), *Wildlife in North Carolina*'s buttons for the N.C. State Fair have proved immensely popular. For some people, collecting a button each year is one of the joys of attending the fair. Among the species represented have been largemouth bass, bobwhite quail, indigo bunting, white-tailed deer and brook trout.



2000s

The magazine's annual photography competition draws thousands of entries each year. Begun in 2005, the winning entries have featured three birds, a fish species, a sea turtle and a landscape. This year's winner will be featured on the Jan.–Feb. 2012 issue.

Mistletoe: Winter's Kiss

written by Terry Krautwurst / illustrated by Amelia Hansen
nature activity by Anne M. Runyon

It's almost December, and most of summer's leafy trees are becoming bare and lifeless-looking. But wait, look up in the tops of some of the trees along rivers, roadsides, and fields. What are those round, ruffled green clusters swaying in the breeze among the branches like pom-poms cheering the sun? It's mistletoe, a plant that for centuries has mystified humans and served as a symbol of holiday celebration. It's the plant people smooch under for good luck.

But there's much more to mistletoe than love and kisses.

BIG FAMILY

Actually, mistletoe isn't just one plant, but a large group of plants. There are over 1,000 different species around the world. Some have large leaves, some have small leaves and some have no leaves. But almost all are aerial plants: they grow above ground, on the stems or limbs of shrubs or trees. Mistletoes are partial parasites, or what botanists call hemiparasites: They get water and nutrients from the plants they live on, but also make at least some of their own food through photosynthesis.

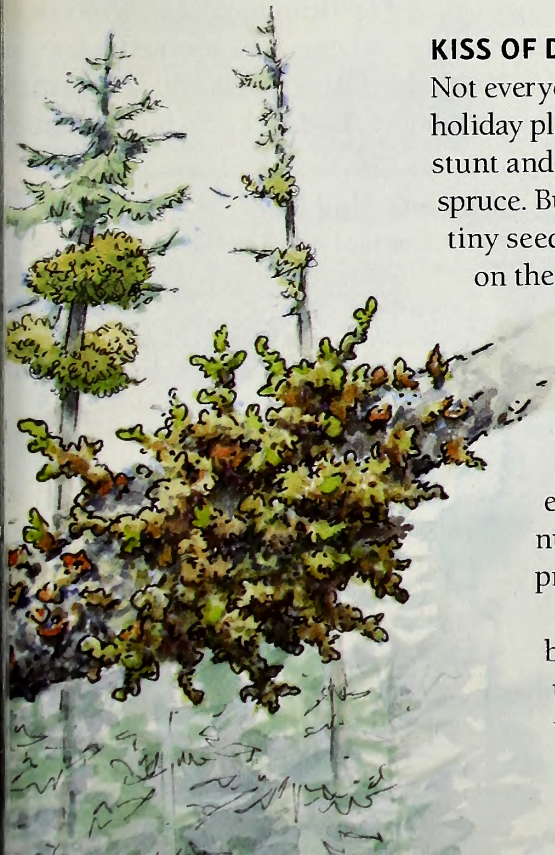
Of about 30 kinds of mistletoe that grow in the United States, there are two types: leafy mistletoes and dwarf mistletoes. Dwarf mistletoes are leafless and look like drab twigs. Most grow on pines, spruces and other conifers in the West and North. Leafy mistletoes are the ones we decorate our homes with during the holidays.

By far the most common—and the only mistletoe that grows in North Carolina and most of the rest of the Southeast and East—is American mistletoe. The plant grows on more than 100 kinds of trees—mostly hardwoods, such as birch, maple, hickory, oak, beech, cherry, chestnut and dogwood. Clusters of its lustrous leathery leaves can become as big as beach balls.

STICKY SITUATION

Mistletoe berries are poisonous to humans, but birds love them and gobble them up. Inside each berry is a seed surrounded by a gummy coating, a substance called viscin that hardens like glue when exposed to air.

Birds that eat the berries "plant" the sticky mistletoe seeds on branches by rubbing off seeds stuck to their beaks or feet, or by leaving them behind in their droppings. When the gluey seed germinates, its primitive root creeps along the branch until it meets a bud, leaf base, or other rough spot. Then it flattens and attaches itself to the wood, forming a disc called a holdfast. The baby root drills into the branch and sends more rootlike structures, called sinkers, that spread under the bark and into the living tissue or cambium. Using water and nutrients from the tree's tissue, the plant grows and eventually develops its own leaves. In autumn, when the tree it's living on loses its foliage, the mistletoe's green food-producing leaves are exposed to more sun than ever, helping it thrive through winter.



KISS OF DEATH?

Not everyone thinks of mistletoe as a harmless holiday plant. In the West and North, dwarf mistletoes stunt and kill valuable commercial timber trees such as fir and spruce. But dwarf mistletoes act differently from leafy mistletoes. Their tiny seeds shoot out from their berries like missiles and rain down on their host tree, infecting it with more and more new plants. And because they're leafless and can't produce as much food by photosynthesis, dwarf mistletoes steal more from their hosts.

American mistletoe and its leafy cousins don't spread as quickly, and seldom actually kill. Usually only a few plants infest a tree. Because they rob their hosts of water and nutrients they can weaken trees during dry times. And fruit and nut growers don't like mistletoe because infested orchard trees produce lower harvests.

Pruning limbs or snipping the mistletoe off and covering the branch with heavy plastic for several months can help control unwanted mistletoe. Remember, though, that mistletoe is a valuable winter food source for birds.

MYTH-LE-TOE?

Mistletoe's ability to grow far above the ground, its roots never touching soil and its leaves green even in winter, seemed magical or miraculous to people of early civilizations. They believed the plant possessed special powers.

In Africa, Walos tribesmen wore mistletoe to protect them in battle. In Scandinavia, enemy soldiers who met among trees bearing mistletoe would declare peace for the day. The Ainu people of Japan's Hokkaido Island still clip mistletoe from sacred willow trees and plant the leaves among garden seeds to encourage good crops.

Northern Europeans believed that mistletoe prevented and cured all illnesses. A few sprigs tied in a bunch and hung over your doorway kept witches and trolls away. You could use it as a divining rod to find buried gold. In ancient Italy, mistletoe was thought to be capable of extinguishing fire.

In what's now the British Isles and western Europe, Druid priests revered oak trees and especially the mistletoe that grew from them. They believed that mistletoe contained the oaks' life energy. Every year in mid-December they would ceremoniously cut mistletoe from oaks using a golden sickle, and distribute it to the people to hang in their homes for luck and protection. In the 1500s in England, kissing under a sprig of mistletoe during the Christmas season became popular—no one is sure why.

Over the centuries, superstitions and religious beliefs about mistletoe faded, but many of the traditions remained. When settlers arrived in the New World, they found American mistletoe, which is similar to European mistletoe, and adopted it for their customs. Today, most Americans still see mistletoe as a simple symbol of good luck and holiday cheer.

Get Outside

Gather holiday mistletoe. Look for clusters of mistletoe in trees along roadsides, forest fields, and rivers and streams. If you're lucky, you'll find clumps growing on branches within easy reach. Usually mistletoe grows higher. Use a ladder and a long-handled pruner, or a pole with a nail partially driven into the end and bent over, to snag the mistletoe. Of course, get permission before gathering mistletoe from private property, and be sure to check with officials before harvesting it from public parks or forest lands.

Watch winter's trees. Trees reveal all kinds of interesting things when they lose their leaves in autumn. Look closely at the buds along those "leafless" branches. Within them are miniature versions of next season's leaves, fully formed and waiting to unfurl in spring. Look at all the different kinds of bark: rough, smooth, furrowed, peeling, wavy, straight-lined, cracked, bumpy, and more. Do you see any nuts or seed pods in the branches? Are there holes, or cavities, where birds or other animals live? Watch how the tree's limbs move in the winter wind. Listen to the rustling of dry leaves still clinging to twigs. Even in winter, trees are beautiful.

Read and Find Out

- "Decking the Halls: The Folklore and Tradition of Christmas Plants" by Linda Allen, Willow Creek Press, 2000.
- "Stories Behind the Great Traditions of Christmas" by Ace Collins, Zondervan, 2008
- "Forest Plants of the Southeast and their Wildlife Uses" by James H. Miller, University of Georgia Press, 2005.

In *Wildlife in North Carolina:*

- "The Parasitic Majority" by Jeff Beane, May 19

Find out more about Project WILD Workshops a literature at the Wildlife Commission's website www.ncwildlife.org.

The Wildlife Endowment Fund

An Investment for the Future

Established in 1981, the Wildlife Endowment Fund allows the Wildlife Resources Commission to accept tax-deductible contributions for wildlife conservation. Money from the sale of lifetime licenses is also placed in this fund. Your donation or purchase will ensure that North Carolina will have a rich wildlife heritage for generations to come.

Lifetime License Form

Infant and Youth *(check appropriate block)*:

- ☐ Sportsman Infant $200
  (under 1 year old—Application must be received before applicant has attained 1 year of age.)
- ☐ Unified Sportsman/Coastal Recreational Fishing Infant $275
  (under 1 year old—Application must be received before applicant has attained 1 year of age.)
- ☐ Sportsman Youth $350
  (ages 1 through 11—Application must be received before applicant has attained 12 years of age.)
- ☐ Unified Sportsman/Coastal Recreational Fishing Youth $450
  (ages 1 through 11—Application must be received before applicant has attained 12 years of age.)

A copy of the birth certificate must accampany applicatians for infant and yauth licenses. Birth certificate documentation cannot be returned.

Note: Pending satisfactory completion of the hunter safety course, persons who possess infant or youth licenses may exercise the privileges thereof when accompanied by an adult who is properly licensed to hunt in North Carolina. "Accompanied" is defined as maintaining a proximity to the hunter which enables the adult to monitor the activities of, and communicate with, the hunter at all times.

Adult (age 12 or older) *(check oppropriote block)*:

- ☐ Comprehensive Inland Fishing. $250
  (N.C. residents only—includes basic inland fishing, trout & trout waters on game lands)
- ☐ Comprehensive Hunting. $250
  (N.C. residents only—includes basic hunting, big game, game lands & N.C. waterfowl)
- ☐ Sportsman. $500
  (N.C. residents only age 12 or older—includes basic hunting & inland fishing, big game, game lands, trout & N.C. waterfowl)
- ☐ Coastal Recreational Fishing $250
  (N.C. residents only—includes coastal recreational fishing)
- ☐ Unified Sportsman/Coastal Recreational Fishing $675
  (N.C. residents only—includes same privileges as the Sportsman, plus coastal recreational fishing)

A federal waterfawl stamp must be purchased separately for all N.C. hunting licenses.

Note: On or after July 1, 1991, a person, regardless of age, may not procure a hunting license or hunt in North Carolina without producing a certificate of competency for completing the hunter safety course or a hunting license effective prior to July 1, 1991, or by signing the statement below that he or she had such a license.

Check appropriate block and attach required copy:

- ☐ Copy of Prior Year Hunting License
- ☐ Copy of Hunter Safety Certificate of Competence
- ☐ In lieu of copy, I am signing the statement below:

Statement: I certify that I was a licensed hunter prior to July 1, 1991.

Signature _____ Date _____

Visit us online at www.ncwildlife.org or call 1-888-248-6834 for a complete list of lifetime licenses, including those for nonresidents and 65 and older.

Lifetime License

Complete the following information if applying for a lifetime license. Be sure to check appropriate block(s) on reverse side *(please print legibly)*:

Name of Applicant _____

Daytime Phone _____

Mailing Address _____

Resident Address _____

County _____ Date of Birth _____ Driver License # _____

E-mail Address _____

Is this license a gift? ☐ Yes ☐ No If yes, mail license to ☐ Donor or ☐ Applicant.

License Donor's Name *(if applicable)* _____

Donor's Telephone # _____

Donor's Mailing Address _____

City _____ State _____ Zip _____

Method of Payment: ☐ Check ☐ VISA ☐ MasterCard

Acct. # _____ Expires _____

Print name exactly as it appears on credit card _____

Cardholder's Signature _____ Date _____

Personalize your Lifetime License for an additional $5:
Indicate your selection of letters, numbers, dashes, periods, commas and /or blanks up to 6 spaces: ___ ___ ___ ___ ___ ___

Indicate your personal message including letters, numbers, dashes, periods, commas and /or blanks up to 21 spaces:

___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
___ ___ ___ ___ ___ ___ ___ ___ ___ ___

Signature of Applicant or Donor _____ Date _____

Note: Only adult lifetime licenses may be purchased by phone or online (VISA or MasterCard only). Call toll-free (1-888-248-6834) or visit us at www.ncwildlife.org. Use this form to purchase infant and youth lifetime licenses by mail.

Tax-Deductible Contribution

☐ I wish to make a tax-deductible contribution to the Wildlife Endowment Fund. Enclosed is my check for $ _____. *(Credit card payments cannot be accepted.)*

Name _____

Daytime Phone _____

Mailing Address _____

City _____ State _____ Zip _____

Make checks payable to: *Wildlife Endowment Fund*

Transactions are not considered final until the check has cleared the bank. Items purchased with a returned check will be made invalid. A service charge of up to $25 will be charged on any returned check. (N.C.G.S. 25-3-506)

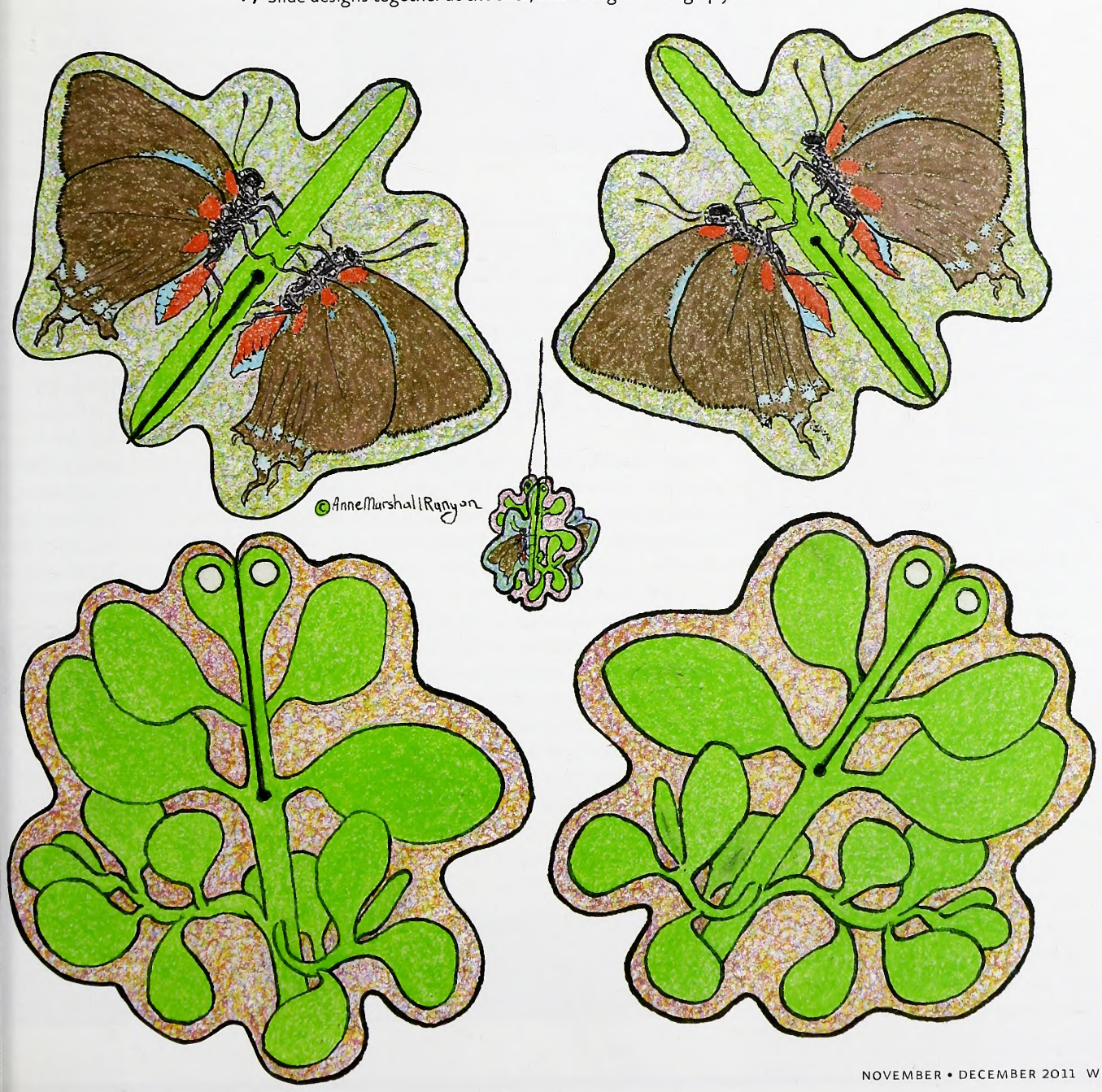
Mail completed application and payment to:
NCWRC, License Section, 1707 Mail Service Center, Raleigh, NC 27699-1707

Office location: *NCSU Centennial Campus, 1751 Varsity Drive, Raleigh, N.C. 27606*
Telephone: 1-888-248-6834 (2HUNTFISH)

Make a Mistletoe and Hairstreak Butterfly Ornament

American mistletoe is the host plant for the Great Purple Hairstreak. In flight, this calm butterfly flashes the bright blue scales on the topsides of its wings. When it perches, the brown undersides and bright orange markings are revealed.

1) Copy onto heavy paper.
2) Cut out the four designs along the black outlines.
3) Match each design to its mate. Glue the backsides together. (Hint: Coat one design's backside with a glue stick. Let dry a little. Then match and glue together. Repeat.)
4) Check both sides and trim away any white edges.
5) Cut a slit in each design along black line, stopping at the dot.
6) Punch two holes in mistletoe.
7) Slide designs together at the slits, add string and hang up your ornament.



Federation Honors Evans, Kittredge

The North Carolina Wildlife Federation named Capt. Jon Evans as its Wildlife Enforcement Officer of the Year for 2011. Evans, a 15-year veteran of the N.C. Wildlife Resources Commission, was recognized for his work while stationed as a sergeant in Alamance County. He has since been promoted to Training Director, with a rank of captain and responsibilities for training and instruction within the agency's Division of Law Enforcement.

In addition, Al Kittredge, a longtime volunteer at the N.C. Wildlife Resources Commission's fishing education center in Fayetteville, won the Wildlife Volunteer of the Year award from the federation.

Evans accepted the award at the Governor's Conservation Achievement Awards banquet in Durham, an occasion to recognize those who have exhibited an unwavering commitment to conservation and an uncommon determination to safeguard the state's natural resources. By recognizing, publicizing and honoring these conservation leaders—young and old, professional and volunteer—the N.C. Wildlife Federation hopes to inspire everyone to take a more active role in protecting the natural resources of the state. The conservation awards were first presented in 1958.

Such is Evans' commitment, away from his work duties he volunteers in conservation activities, particularly with youth. He has organized "Fish for Fun" events with a local summer camp, is an instructor in hunter education and boater education and teaches a rifle marksmanship class.

"Each year we are amazed at the commitment and creativity of North Carolina citizens in protecting wildlife and wild places," said Tim Gestwicki, executive director of the North Carolina Wildlife Federation. "Many of our award winners tell us their Governor's Conservation Achievement Award represents the high point of their career, whether they are full-time scientists or full-time volunteer conservationists. "This awards program brings together a remarkably diverse group of conservationists to highlight the 'good news' about wildlife conservation in North Carolina. Our primary focus is to applaud and honor these people who work so hard for wildlife and the air, water, land that they and all of us depend upon."

DAVID BLEVINS

Awards winners are decided upon by a committee of scientists, environmental educators and conservation activists. "Working in the field, the job changes with the seasons," Capt. Evans said. "No two days are ever the same. You go from working duck hunting and small game, to working boating and fishing, back to turkey hunting and then boating and fishing again, and then it's dove season and deer season. I appreciate the responsibility of protecting our wildlife resources and preventing those who would unlawfully exploit them."

Col. Dale Caveny of the Division of Law Enforcement of the N.C. Wildlife Resources Commission said this recognition is mu deserved, as Evans exemplifies the de cation and willingness of wildlife office to fulfill their mission.

Since 2001, Kittredge has worked a volunteer fishing instructor at the commission's John E. Pechmann Fishi Education Center, where he has been instrumental in helping commission st recruit, train and coordinate more tha 45 volunteers to conduct fishing outrea and education at the center.

He serves as the liaison between the commission and Fort Bragg's Warrior Transition Battalion, coordinating numer ous "wounded warrior fishing events" th provide opportunities for soldiers to lear basic fishing skills, such as fly-tying, kno tying, casting and fly-fishing. Since initia ing contact with Fort Bragg in 2006, Kittre has helped center staff host 36 events, invo ing 703 soldiers and their family member

In addition to the wounded warrior ever Kittredge volunteers at numerous children fishing events, as well as other aquatic resou conservation events hosted by the center.

"The highly successful Boy Scout fly-fi ing clinics, hosted by the Pechmann Cent are lauded by the scouting community, in part because Al and his fellow volunteer fi ing instructors assist center staff who tea the fly-fishing merit badge requirements to Boy Scout troops across the county," sa Kristopher Smith, director of the Pechma Center. "Al's generous donation of time a selfless commitment to the center's obje tives have ensured the success of our fishi outreach programs and projects."

e NEWSLETTER
Get N.C. Wildlife Update—news including season dates, bag limits, legislative updates and more—delivered to your Inbox from the N.C. Wildlife Resources Commission. Sign up at www.ncwildlife.org/enews.

.C. Shooters Win in Hunter Ed Challenge

orth Carolina competitors took the top two places in the senior team and sen-ior individual competitions at the annual Youth Hunter Education Challenge on, N. M.

e Youth Hunter Education Challenge is a demanding, week-long series of events, ing shooting competition in .22 rifle and muzzleloader at knock-down targets, un on a sporting clays course and archery at three-dimensional game targets. A hooting component includes orienteering, wildlife identification, a written hunter nsibility and ethics exam, and a hunter safety trail test.

e Forbush High School Senior Red team won the team competition with 8,761 s, followed by another North Carolina squad, the Gray Stone Marksmen with 2. Hunter Efird of Gray Stone was the top senior individual, scoring 1,845 points t Colton Horn of Forbush by 18 points.

orth Carolina's Park Ridge Sharpshooters took second place in the junior team com-on behind Oregon.

early 350 competitors, coaches and parents attended the event in New Mexico. ually, some 50,000 young people take part in youth hunter safety skills events s the United States and Canada.

orth Carolina teams compete in Youth Hunter Safety Skills Tournaments, a com-nt of the Hunter Education Program, in senior (high school) and junior (middle lementary schools) divisional levels. A daylong competition is held in all nine cts statewide, with overall team and overall individual awards based on aggregate s in all events.

unter education is required for all first-time hunting license buyers in North lina. For more information on free hunter education courses, the Home From Hunt™ safety campaign or youth programs offered by the N.C. Wildlife Resources mission, call 919-707-0031 or go to www.ncwildlife.org.

Third WNC Fly-Fishing Expo Opens

he Third Annual Western North Carolina Fly-Fishing Expo kicks off on Nov. 5 at the WNC Agricultural Center near Asheville.

or those who want to learn more about fly-fishing, a distinguished roster of experts hold programs and presentations throughout the weekend (visit www.wncflyfish-xpo.com for more information). Presenters include outdoor and fly-fishing author Casada; advocate Tim Landis, an instrumental figure in protecting wild fish on the South Holston; fly-fishing instructor Star Nolan; Capt. Paul Rose, a pro at sight-fishing for carp; Bill Strickland, expert on the secrets of the Davidson River; strike indicator developer Steven Vorkapich; and Beau Beasley, who will introduce folks to trout fishing in Virginia. Visitors also may take in fly-tying and casting demonstrations from expert instructors.

Nationally known manufacturers such as Abel, Orvis, Sage, Simms and Fishpond will showcase the newest gear. Area fishing lodges and guide outfitters will give advice about where to fish; organizations dedicated to protecting trout waters and habitat will discuss current issues and initiatives; and more than a dozen fly shops from all over WNC will have booths. The show opens on Saturday at 9 a.m. and runs until 5 p.m., then continues on Sunday from 9 a.m. until 4 p.m.

IN SEASON

In November and December, these seasons are open in North Carolina:

Black Bear: See *Regulations Digest* for seasons and locations.
Bobcat: Through Feb. 29.
Brant: Nov. 19–Dec. 3 and Dec. 17–Jan. 28.
Canada Goose and White-Front Goose: Resident Population Zone Nov. 12–Dec. 3; Dec.17–Feb. 4. Southern James Bay Zone through Nov. 4 and Nov. 12–Dec. 31.
Common Snipe: Nov. 14–Feb. 28.
Crow: Through Feb. 29.
Ducks, Coot and Mergansers: Nov. 12–Dec. 3 and Dec. 17–Jan. 28.
Feral Swine: No closed season.
Fox: See Regulations Digest for seasons and locations.
Hatchery Supported Trout Waters: Through Feb. 29.
Light Geese (Snow, Blue and Ross'): Nov. 12–March 10.
Mourning Dove: Nov. 21–Nov. 26 and Dec. 17–Jan. 13.
Pheasant: Nov. 19–Feb. 1.
Quail: Nov. 19–Feb. 29.
Rabbit: Nov. 19–Feb. 29.
Raccoon and Opossum: Through Feb. 29.
Rails, Gallinule and Moorhen: Through Nov. 9.
Ruffed Grouse: Through Feb. 29.
Squirrel: Gray and red through Feb. 29; fox through Dec. 31 in selected counties.
Tundra Swan: Nov. 12–Jan. 31 (by permit only).
White-tailed Deer: Eastern: Gun season through Jan. 2. Central: Muzzleloader season through Nov. 11; gun season Nov. 12–Jan. 2. Northwestern: Bow season through Nov. 4; muzzleloader season Nov. 5–Nov. 18; gun season Nov. 19–Jan. 2. Western: Bow season through Nov. 19; gun season Nov. 21–Dec. 10.
Woodcock: Dec. 15–Jan. 28.
Youth Waterfowl Day: Dec. 10. (An additional Youth Waterfowl Day will be held Feb. 4.)

There is no closed season or bag limit for groundhog, coyote, striped skunk and nutria. There is an open season for taking beaver with firearms or bow and arrow during any other open season for the taking of wild animals.

Check the 2010–2011 *North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

CALENDAR OF EVENTS

Tuesday–Sunday, Nov. 8–13

Learn about the diverse habitats and wildlife of the Outer Banks at Wings Over Water in Kill Devil Hills. Participants may bird and paddle the marshes and coast, listen for red wolves and watch for bear in pocosin forests and open fields. Visit www.wingsoverwater.org.

Saturday–Sunday, Nov. 5–6

Spend a day at the second annual Western North Carolina Fly-Fishing Expo in Fletcher. Programs will concentrate on mountain fishing. Fly-casting instruction is offered. Exhibitors include gear manufacturers, fly shops, guide services and the Wildlife Resources Commission. Visit www.wncflyfishingexpo.com

Saturday–Sunday, Dec. 3–4

Check out the 23rd Annual Core Sound Decoy Festival at Harkers Island Elementary School. Over 90 exhibitors will be displaying and selling decoys and waterfowl artifacts. Waterfowl Weekend at the Core Sound Waterfowl Museum runs concurrently with the Decoy Festival. Visit www.decoyguild.com and www.coresound.com.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

WRC Partners with Foundation on Adopt-a-Boat-Ramp Project

The N.C. Wildlife Resources Commission is partnering with the North Carolina Public Access Foundation (NCPAF) on a program that encourages groups, businesses, organizations and individuals to "adopt" Boating Access Areas to keep them clean and litter free.

Several groups, including the East Carolina University Bass Fishing Team and the UNC Charlotte Bass Rats fishing club, have adopted access areas through the "Adopt-a- Boat-Ramp" initiative and have held several litter clean-ups. The Bass Rats also helped build handicapped access at the South Point Boating Access on Lake Wylie.

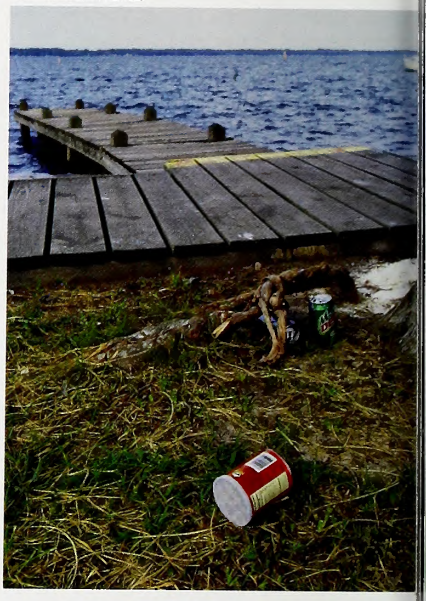
"Any time a citizen cleans up a ramp, it frees time and money that could be better used to expand parking areas and build more ramps," said Mike Marsh, chairman of the N.C. Public Access Foundation. "Having a college fishing club adopt a boat ramp gets young people involved with public access needs, but any individual or organization can adopt a ramp."

The NCPAF has also donated $500 to the construction of the Hampstead Boating Access Area in Pender County. Construction is set to begin this fall, and the site is slated to open in spring 2012.

"The Hampstead Boating Access Area is located in an area that has experienced a severe need for free public access to the Intracoastal Waterway and adjoining backwaters for many years," Marsh sai "This particular area of the coast has th most crowded boat ramps in the state and, therefore, has the greatest need for new ramps and expanded parking at existing ramps."

To learn more about adopting a ramp, Justin Marsh at 910-524-4713 or visit t foundation's website at www.ncpaf.co For more information on boating in No Carolina, including an interactive ma of more than 200 free, 24-hour boatin access areas, go to www.ncwildlife.org

MELISSA McGAW / NCWRC



Commission Adds Second Youth Waterfowl Day

The N.C. Wildlife Resources Commission has set season dates, bag limits and applicable regulations for the 2011-12 seasons.

Of special note this year is the addition of a second Youth Waterfowl Day. In recent years, the Commission has chosen the Saturday after the end of the duck season as the Youth Waterfowl Day. However, with recent changes to U.S. Fish and Wildlife Service guidelines, a second Youth Waterfowl Day will be offered. Youth Waterfowl Days this season will be Dec. 10, 2011 and Feb. 4, 2012.

Working within mandatory frameworks established by the U.S. Fish and Wildlife Service, the commission has set the following regulations:

BAG LIMITS: A) Conventional bag: 6 ducks with no more than 4 scoters, 4 mallards with no more than 2 hen mallards, 3 wood ducks, 2 redheads, 2 scaup, 2 pintails, 1 black or mottled duck (seasons closed on black and mottled ducks until Nov. 19), 1 canvasback, or 1 fulvous whistling duck. The season on harlequin ducks is closed. (Possession limits are twice the daily bag limit unless otherwise noted.)

B) Other limits:

- 25 light geese (includes snow, blue and Ross' geese), no possession limit
- 2 brant
- 5 mergansers (2 hooded mergansers)
- 7 sea ducks (in special sea duck area only In other areas, sea ducks are part of the re ular duck bag limit. No more than 4 scote per day may be taken in either season.
- 15 coots
- 5 dark geese (includes Canada geese & white-fronted geese) in the Resident Hur Zone, 5 in the Southern James Bay Zone and 1 in the Northeast Hunt Zone.

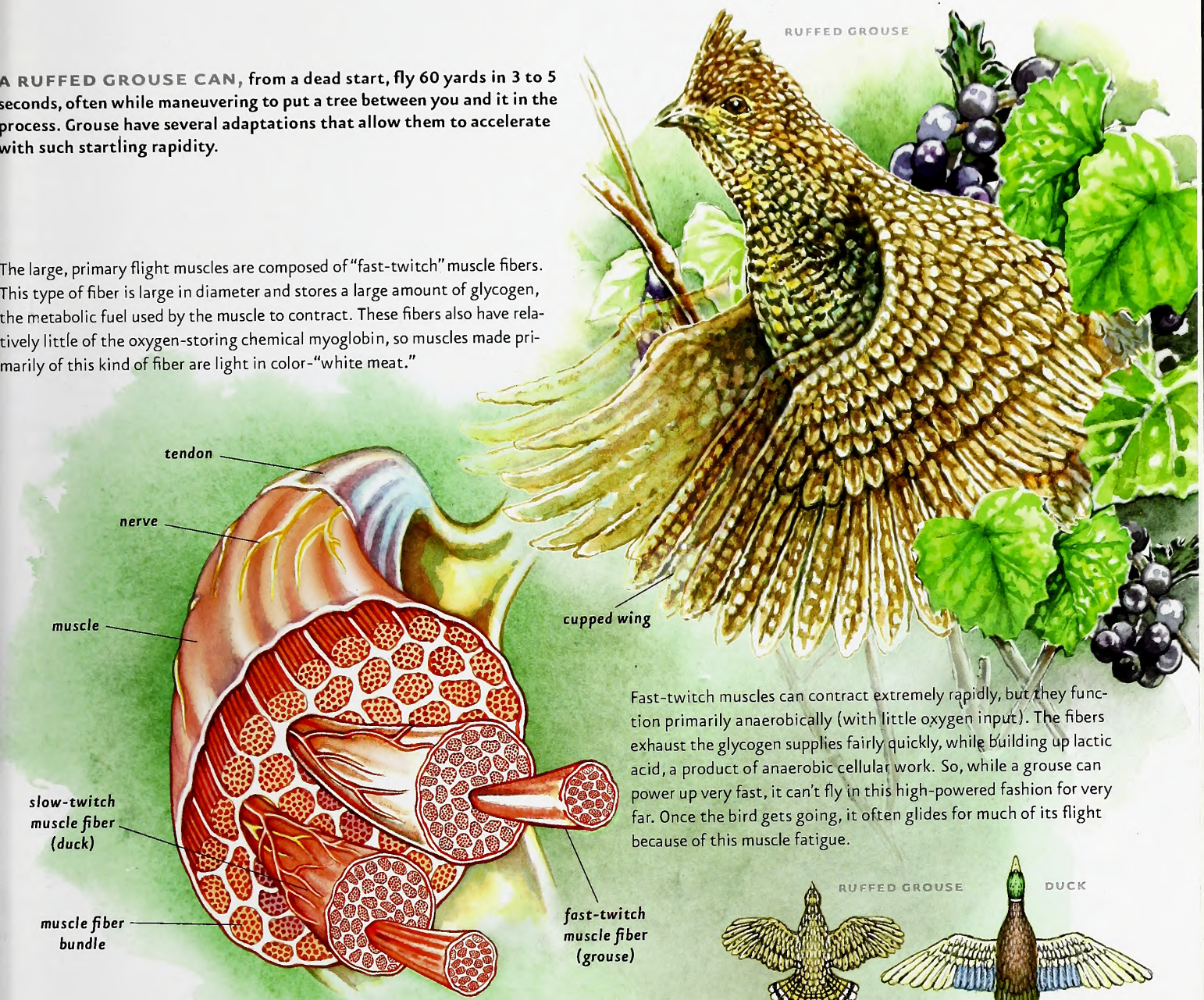
HOURS: One-half hour before sunrise to suns

How Can Grouse Flush So Fast?

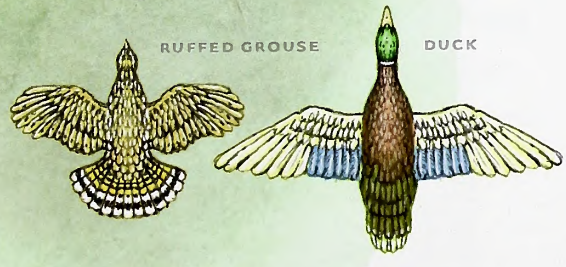
written by Clyde Sorenson
Illustrated by Jim Brown

A RUFFED GROUSE CAN, from a dead start, fly 60 yards in 3 to 5 seconds, often while maneuvering to put a tree between you and it in the process. Grouse have several adaptations that allow them to accelerate with such startling rapidity.

The large, primary flight muscles are composed of "fast-twitch" muscle fibers. This type of fiber is large in diameter and stores a large amount of glycogen, the metabolic fuel used by the muscle to contract. These fibers also have relatively little of the oxygen-storing chemical myoglobin, so muscles made primarily of this kind of fiber are light in color-"white meat."

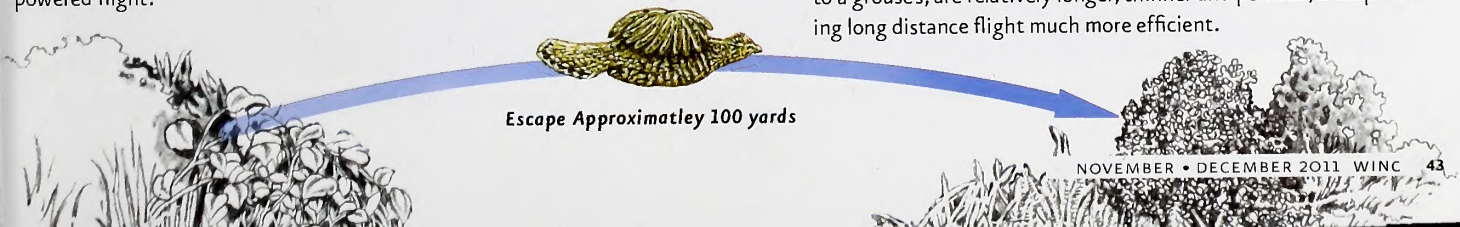


Fast-twitch muscles can contract extremely rapidly, but they function primarily anaerobically (with little oxygen input). The fibers exhaust the glycogen supplies fairly quickly, while building up lactic acid, a product of anaerobic cellular work. So, while a grouse can power up very fast, it can't fly in this high-powered fashion for very far. Once the bird gets going, it often glides for much of its flight because of this muscle fatigue.



The shape of the grouse's wing also facilitates its hasty escapes. The broad, strongly cupped, and stiff wings of the grouse provide tremendous lift, powered by those large, fast twitching breast muscles. The notch in the trailing edge of the bird's wing formed by the relatively short inner primaries enhances vertical lift, but it compromises long distance powered flight.

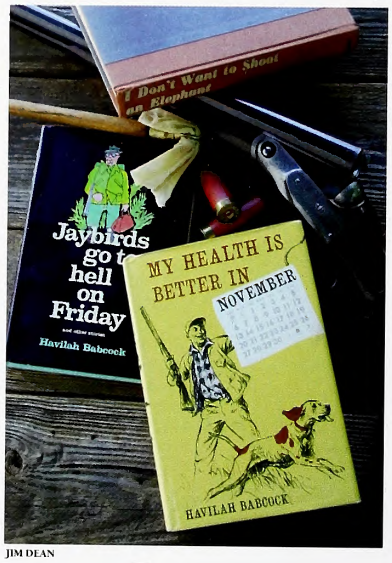
Ducks, on the other hand, are long distance fliers; their breast muscles are composed of the dark, myoglobin-rich, highly vascularized, thin diameter, "slow-twitch" muscle fibers found in muscles adapted to endurance work, like long distance migration. Duck wings, compared to a grouse's, are relatively longer, thinner and pointed, a shape making long distance flight much more efficient.



Bobwhites and Babcock

written by Jim Dean

My old college classmate Dick Hardy was smart, fun-loving and charismatic, but he charted his path in ways that sometimes astonished his sophomore English major friends at the Virginia Military Institute in 1960. Though Hardy generally made decent grades, we all suspected that he glided along at little more than a fast idle, and was capable of far better. He hated to study, and I never observed him actually doing so. Typically, he sailed through his Shakespeare course without ever taking a note or opening a book, relying solely on the fact that he had previously read the Bard's plays and poetry for sheer pleasure.



JIM DEAN

I recall that we were also impressed with Hardy's grandiose proposal to compare and contrast the lives of Jesus and Socrates for his semester term paper in classics literature. Would all that shining promise finally be revealed? Alas, the night before it was due, he admitted that he had neither done any research, nor written a word.

"I'll just pull an all-nighter," he told me, but in class the following morning, he turned in a single page—in a handsome folder—that read in its entirety: "After exhaustive study, I have determined that there are no relevant parallels between Jesus and Socrates." He flunked, of course, but our professor had a whimsical, not altogether unappreciative, smile on his face when he returned Hardy's paper to him. Hardy made up the course in summer school, impressing the bemused professor, and earning a legitimate A.

"Hardy's influence on my own grade-point average was nearly disastrous until I realized I didn't have the mental firepower to adopt his cavalier attitude toward schooling."

Hardy's influence on my own grade-point average was nearly disastrous until I realized I didn't have the mental firepower to adopt his cavalier attitude toward schooling. Even so, we were on more equal footing in our mutual fondness for hunting bobwhite quail.

Both of us had grown up hunting bobwhites—me in rural eastern North Carolina and Hardy around Blackstone, Va.—with fathers and grandfathers who carried classic Parker or Fox shotguns and stalked the solemn November pea fields behind English setters and pointers. Our education in these matters had also come when coveys of bobwhites could still be found, and when hunting them was considered an honorable pursuit. Hardy and I spent (some might say wasted) many hours swapping tales of those hunts and the quixotic exploits of our dogs.

And, quite naturally, our literary patron saint was Havilah Babcock. Babcock, born in Appomattox, Va., had spent his undergraduate years at Elon College and the University of Virginia, then returned to Elon as head of the English Department, later to become professor of journalism at William and Mary. In 1927, he joined the faculty at the University of South Carolina where he earned a Ph.D. and taught for 38 years, 27 of those as head of the English Department. Here, he began to write for outdoor magazines, and his essays appeared in four memorable collections: "My Health is Better in November" (1947), "Tales of Quails 'n Such" (1951), "I Don't Want to Shoot an Elephant" (1958) and "Jaybirds Go to Hell on Friday" (1964).

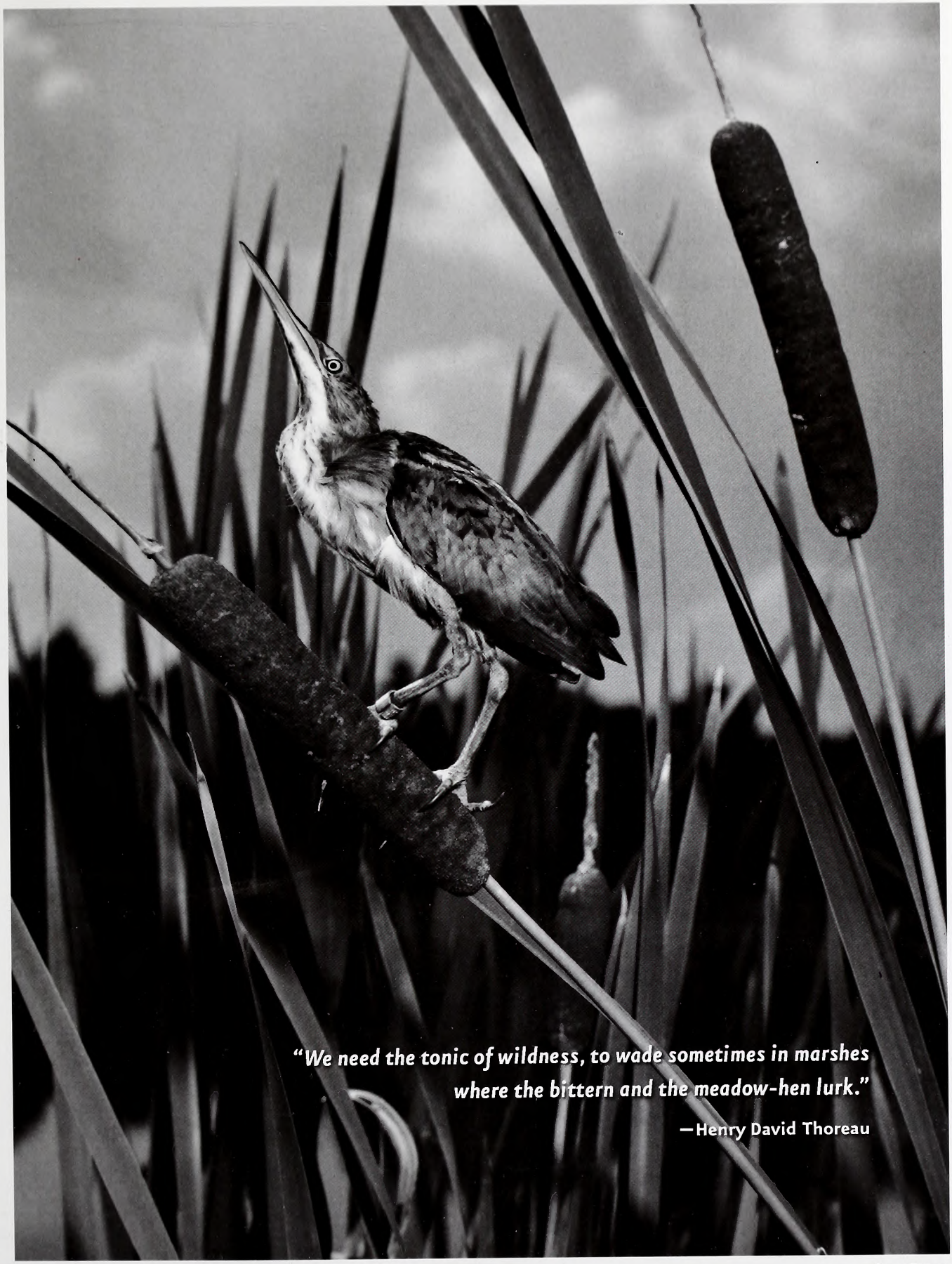
Though Babcock also wrote about fishing, his ruling passion was hunting bobwhites, and no one before, or since, has depicted bird hunting in the South so eloquently, or with such perceptive humor. Despite the passage of time, and the precipitous decline of quail populations, his essays remain timeless, polished gems. Following Babcock's death in 1964, *Field & Stream* noted that his stories were "like good wine, they grow better with age."

Babcock was at the peak of his writing career in the early '60s, and Hardy was determined to meet him. Hardy had never been particularly enthusiastic about the advantages of a military education anyway, and he revealed his escape plan during one of the few occasions when we had a chance to hunt together. After that sophomore year, he transferred to the University of South Carolina where he immediately enrolled in Babcock's popular English class. When Hardy called me sometime later, I asked him about Babcock.

"He was a delight, everything we ever imagined he might be," Hardy said, "and his classes were fascinating." Of course, he sometimes skipped them, almost surely to go hunting. We found a note on the chalkboard after Thanksgiving stating that he planned to be sick the following week.

"It was not a particularly hard course, however," Hardy said. "Anybody who showed up could pretty much expect to get a B, but to ensure that you got an A, you had to take him bird hunting."

True or not, Hardy got his A. Within a few years I lost track of my old classmate, though I sometimes wondered what had become of him. Then, this past August, nearly 50 years since I last spoke with him, Hardy's brief obituary appeared in the alumni review. He had died the previous February in Norfolk, but there was little mention of his achievements or interests. Except this. He had been a voracious reader, and he spent his spare time hunting bobwhites.



JACK DERMID

Least Bittern

OUTDOOR MOMENT

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